The RUBBER AGE

TECHNOLOGY DEPARTMENT

December 1947

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Agerite
Stalite

R·T·VANDERBILT·CO·N·Y·S·
AMERICAN PRODUCTS

AGERITE STALITE is a superior general purpose, free flowing liquid, antioxidant.
Readily soluble in rubber and non-blooming.
Minimum staining in contact with lacquers.
Suitable for use in carcass stocks of white sidewall tires.

Readily available

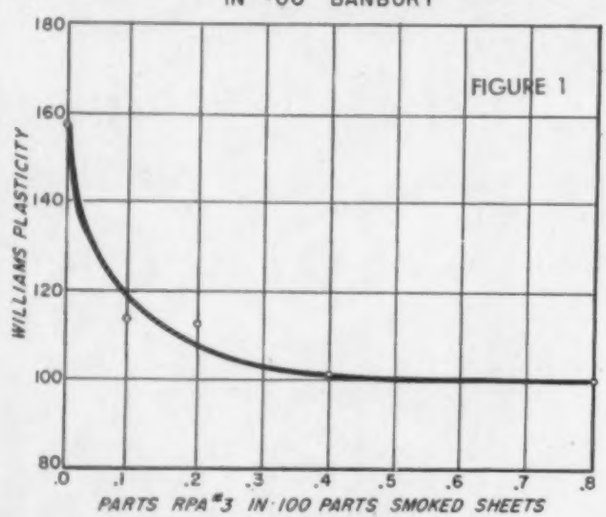
R. T. VANDERBILT CO., INC.
230 PARK AVENUE, NEW YORK 17, N. Y.

Du Pont RPA* No 3

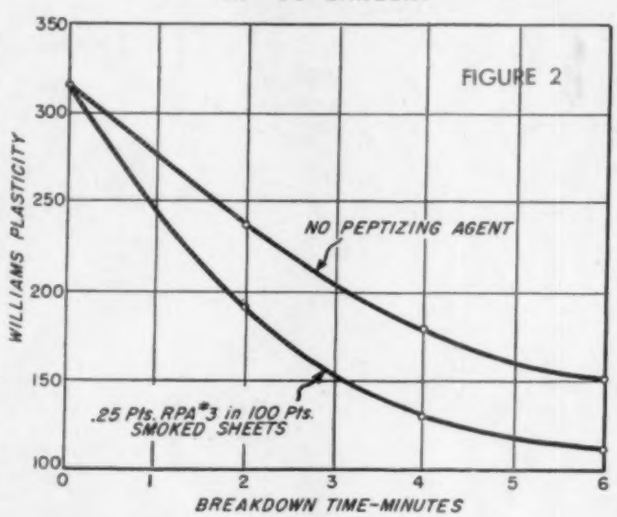
*Rubber peptizing Agent

- Shortens Breakdown Time
- Reduces Breakdown Costs
- Increases Capacity of Processing Equipment
- Improves Processing Quality of Rubber Stocks

EFFECT OF CONCENTRATION OF RPA 3 ON WILLIAMS PLASTICITY OF 1800 GRAM BATCH OF SMOKED SHEETS AFTER 6 MINUTES BREAKDOWN IN #00 BANBURY



EFFECT OF BREAKDOWN TIME ON PLASTICITY OF 1800 GRAM BATCH OF SMOKED SHEETS IN #00 BANBURY



RPA No. 3 is a highly efficient rubber peptizing agent which accelerates the plasticization of crude rubber during pre-mastication or mixing. *Because RPA No. 3 is a liquid, it may be uniformly and economically fed into the plasticator or Banbury by means of automatic dispensing equipment.*

Figure 1 shows that RPA No. 3 is effective in very small amounts when incorporated into crude rubber masticated in a Banbury. Figure 2 shows the remarkable plasticizing effect of .25 parts of RPA No. 3 in 100 parts of rubber at different mixing times.

RPA No. 3 is an ideal peptizing agent because:

1. *Stocks containing it do not require high breakdown temperatures or heat after-treatment.*
2. *Rubber stocks can be quickly plasticized in the mixer with the aid of RPA No. 3. Pigments and fillers can be incorporated immediately, thus eliminating the need for two-stage operation.*
3. *The use of RPA No. 3 does not cause excessive softening when stocks or scrap are reworked.*
4. *RPA No. 3 does not discolor the vulcanizate nor impart odor to it.*

Many leading rubber manufacturers recognize RPA No. 3 as the most economical and effective means for plasticizing rubber and improving the processing properties of rubber stocks. Let us demonstrate how RPA No. 3 can be used to advantage in your plant. Write to: E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Div., Wilmington 98, Del.

Tune in to Du Pont "Cavalcade of America," Monday Nights—8 p. m. EST, NBC

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

DU PONT

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. December, 1947. Vol. 62, No. 3.

PERMANENT RESILIENCE

Resilient parts made from HYCAR synthetic rubber *stay* resilient. That's partly because of HYCAR's unusual chemical stability—its resistance to oil and gas, acids and most other chemicals. And parts made from HYCAR are extremely resistant to the effects of oxidation, sunlight, and normal aging. A HYCAR sealing ring, for example, will maintain a positive seal through years of service even when constantly exposed to oils and acids inside the pipe, and sunlight and salt air outside.

Other unusual and valuable properties are listed in the box at the right. But most important, these properties may be had in an almost limitless number of combinations, each designed to meet the specific service conditions of the finished part. Parts made from HYCAR have seen service in *every* industry, giving long life, dependability, and economical operation.

That's why we say ask your supplier for parts made from HYCAR. Test them in your own applications, difficult or routine. You'll learn for yourself that it's wise to use HYCAR for long-time, dependable performance. For more information, please write Dept. HB-12 B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

CHECK THESE SUPERIOR FEATURES OF HYCAR

1. *EXTREME OIL RESISTANCE — insuring dimensional stability of parts.*
2. *HIGH TEMPERATURE RESISTANCE—up to 250° F. dry heat; up to 300° F. hot oil.*
3. *ABRASION RESISTANCE—50% greater than natural rubber.*
4. *MINIMUM COLD FLOW—even at elevated temperatures.*
5. *LOW TEMPERATURE FLEXIBILITY—down to —65° F.*
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8. *HARDNESS RANGE—compounds can be varied from extremely soft to bone hard.*
9. *NON-ADHERENT TO METAL—compounds will not adhere to metals even after prolonged contact under pressure. (Metal adhesions can be readily obtained when desired.)*

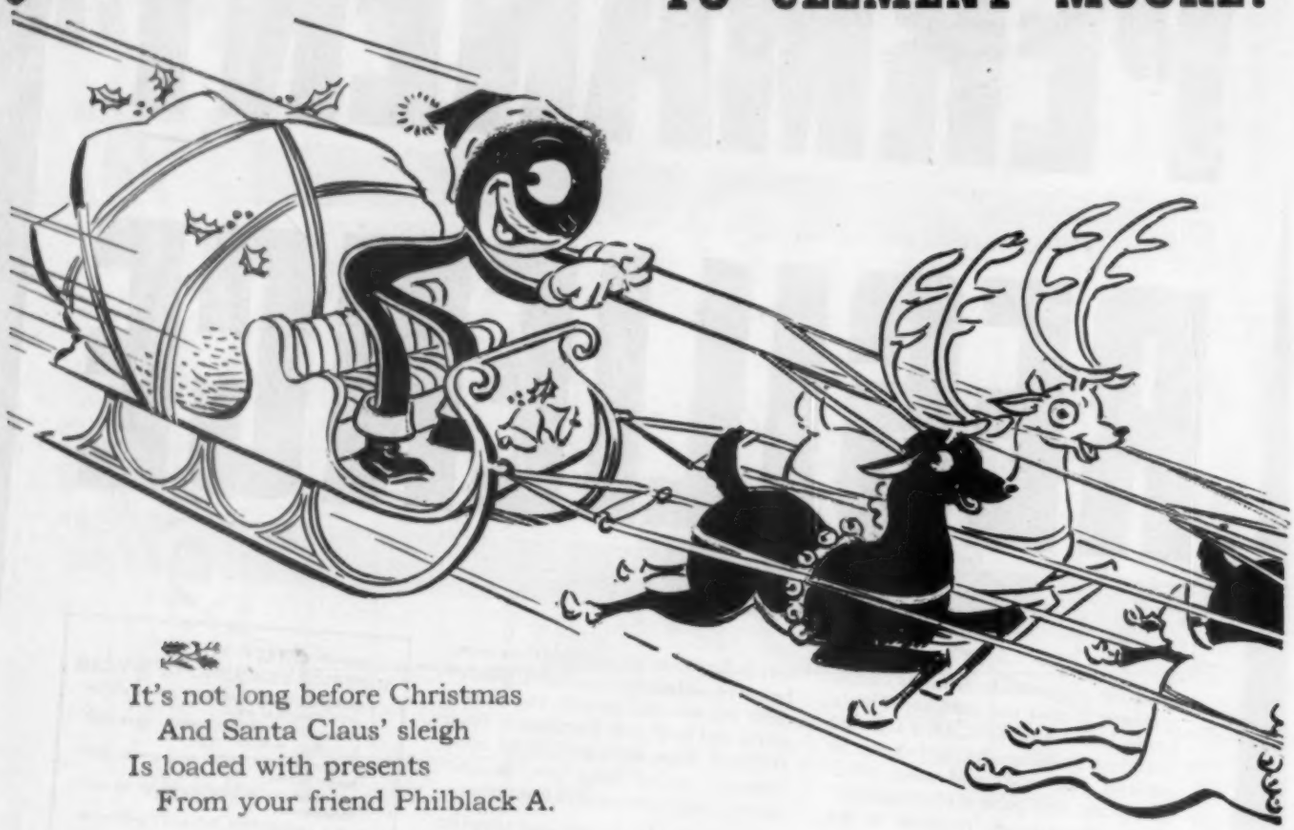
Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

This advertisement appeared in a long list of carefully selected business papers TO HELP YOU SELL parts made from HYCAR.

With Apologies

TO CLEMENT MOORE!



It's not long before Christmas
And Santa Claus' sleigh
Is loaded with presents
From your friend Philblack A.

For makers of tires, there's
"Resistance to cracks."
"Low heat build-up" too,
(No fooling! *That's facts!*)

For "low hysteresis"
"Easy processing," too,
Just use Philblack A . . .
That's all you need do!

For "tubing and splicing"
"Extrusions so smooth"
If you use Philblack A
You'll be in the groove!

And we heard Philblack say
As he drove out of sight
"Write a letter to Santa
Ask for *Philblack, tonight!*"

PHILLIPS PETROLEUM COMPANY

***Philblack* Division**

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO

THE owners of this streamlined speedster will be proud of its smart interior for years to come—because it is upholstered with a flexible plastic sheet made from one of the GEON polyvinyl resins. Like other products made from Geon, the combination of properties which it provides is not duplicated by other materials. This Geon upholstery is beautiful—pleasant to touch—highly resistant to wear—to fire, spray, moist air, oils, grease, gasoline, and acids. Soap and water keep it clean.

These valuable properties which Geon imparts are found in countless numbers of other products from shower curtains to tank linings, fly swatters

Beauty that needn't be pampered

to wire insulation, upholstery to highway markers.

It can be pressure or injection molded, calendered or cast into sheets or film. In solution or latex forms it can be applied as coatings or impregnants for fibers, fabrics, paper and cardboard. Products made from Geon may be flexible or rigid, clear or opaque, brilliantly or delicately colored.

Doesn't this suggest something to you that could be made better from Geon?

We make no finished products from Geon, or from any other raw materials manufactured by B. F. Goodrich Chemical Company. However, we'll be glad to work with you on any special problems of applications. We are particularly interested in developing new end uses for these materials. For more information please write Dept. R-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

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A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Good-rite
VULTROL
for use in American rubber compounding
to prevent scorching, and for recovering
scorched stocks
GOOD-RITE AND VULTROL REG. T.M. U.S. PAT. OFF.

For technical data please write Dept. CB-12

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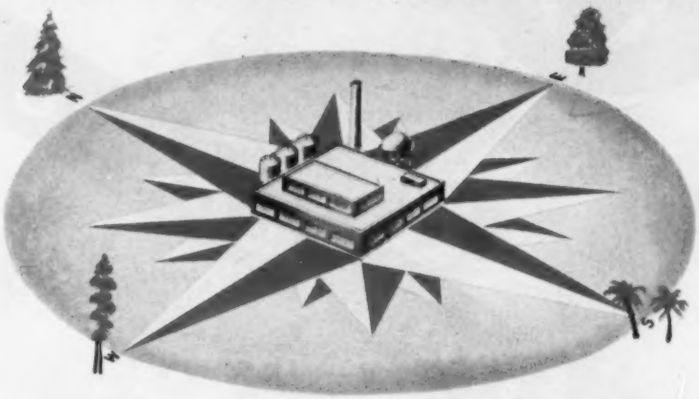
OUR PLANTS BLOOM THE YEAR 'ROUND

...IN YOUR BACK YARD!



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it's TITANOX for whiteness and wear-ability

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No wonder the better rubber manufacturers specify TITANOX for making their products look well, wear well, *sell* well.

Our Technical Service Laboratory is available for advice and help in solving your pigmentation problems. This service is yours by merely contacting your nearest Titanium Pigment Corporation office.

5028

TITANOX

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BOSTIK

CUSTOMIZED ADHESIVE #7008

for Bonding Speaker Components

BOSTIK conforms to the semi-automatic procedure developed by Radio Corporation of America in the manufacture of home instrument speakers. It can be handled by *any* of the means in which other adhesives are used: wet bonding, dry bonding by means of heat and pressure, or tack bonding using solvents. For these reasons, BOSTIK No. 7008 has been chosen by this ranking radio builder for this important process.

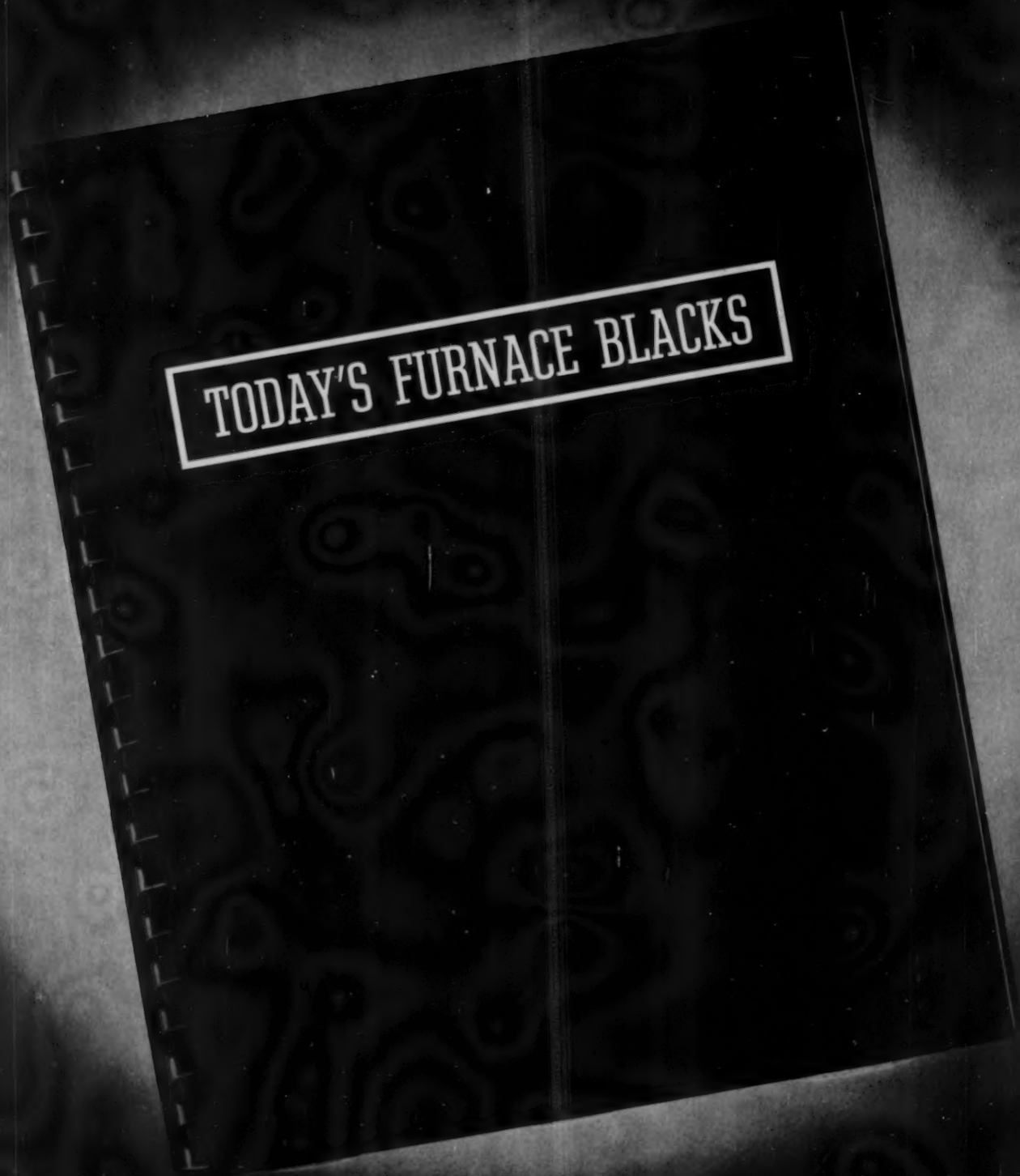
In laboratory tests made by Radio Corporation of America at 95% relative humidity and 100 degrees Fahrenheit for periods as long as three months, as well as in elevated temperature tests, *there has been no adhesive failure produced to date in speakers in which BOSTIK was used.*

With thousands of other manufacturers, too, BOSTIK has supplied right answers to tough bonding problems. Whatever materials, or combination of materials, you wish to bond together, call on B. B. There's a BOSTIK Customized *Adhesive for every job. Write for full information today . . . and be sure to ask for your copy of "Adhesive Facts."*

B B CHEMICAL COMPANY, CAMBRIDGE, MASS.

"Whatever It Is BOND IT WITH BOSTIK"

Customized Adhesives



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More and more CARBON BLACK users are seeking in furnace blacks the means of solving their manufacturing problems and of bettering the performance of the finished products.

For a wealth of fundamental information on all types of furnace blacks and new developments, your attention is directed to our new book

"TODAY'S FURNACE BLACKS"

It should prove exceedingly helpful to you. A copy is yours for the asking. It may be obtained from our sales offices in New York, Akron, Chicago and Boston, or from our Research Division in Charleston, West Virginia.

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UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia

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PLASTICIZER SC
AT GREATLY REDUCED COST
NOW
A IMPROVED PROCESSING
B LOW VOLATILITY
C LOW TEMPERATURE
PROPERTIES
• PLASTICIZER SC is widely used in both rubber and synthetic resin compounding for high plasticizing action down to extremely low temperatures . . . It is stable at high temperatures, and no volatilization or decomposition occurs on working at high calender or other operating temperatures . . . It is recommended for a wide range of products, including embossed surface products, soles and heels, fabric coatings, wire and cable insulation, tubing, unsupported films and aqueous dispersions.
Compatible With—
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PLASTICIZER SC is now readily available at greatly reduced cost for providing exceptionally desirable properties in countless finished products . . . Its application in compounds of various types of rubbers and resins makes it one of the most versatile of plasticizers—as well as the most effective in providing high plasticity quickly. It improves processing of stocks, cuts time on production.
Write for complete data and sample.
Manufactured by
E.F. DREW & CO., INC.

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Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

Announcement

KALITE and KALVAN, for many years, have been distributed to rubber manufacturers through The R. T. Vanderbilt Company. This sales arrangement will be changed, effective January 1, 1948.

After January 1, 1948, KALITE will still be available, but KALVAN will no longer be manufactured, but a similar material known as MULTIFEX, will be offered to the rubber industry. Both KALITE and MULTIFEX will be warehoused and sold through our branch offices.

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• • • • We appreciate the business you have given us in the past through our distributor, and we assure you that we will continue to devote our best efforts to serve you through our own sales and technical service organizations.

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announcing:

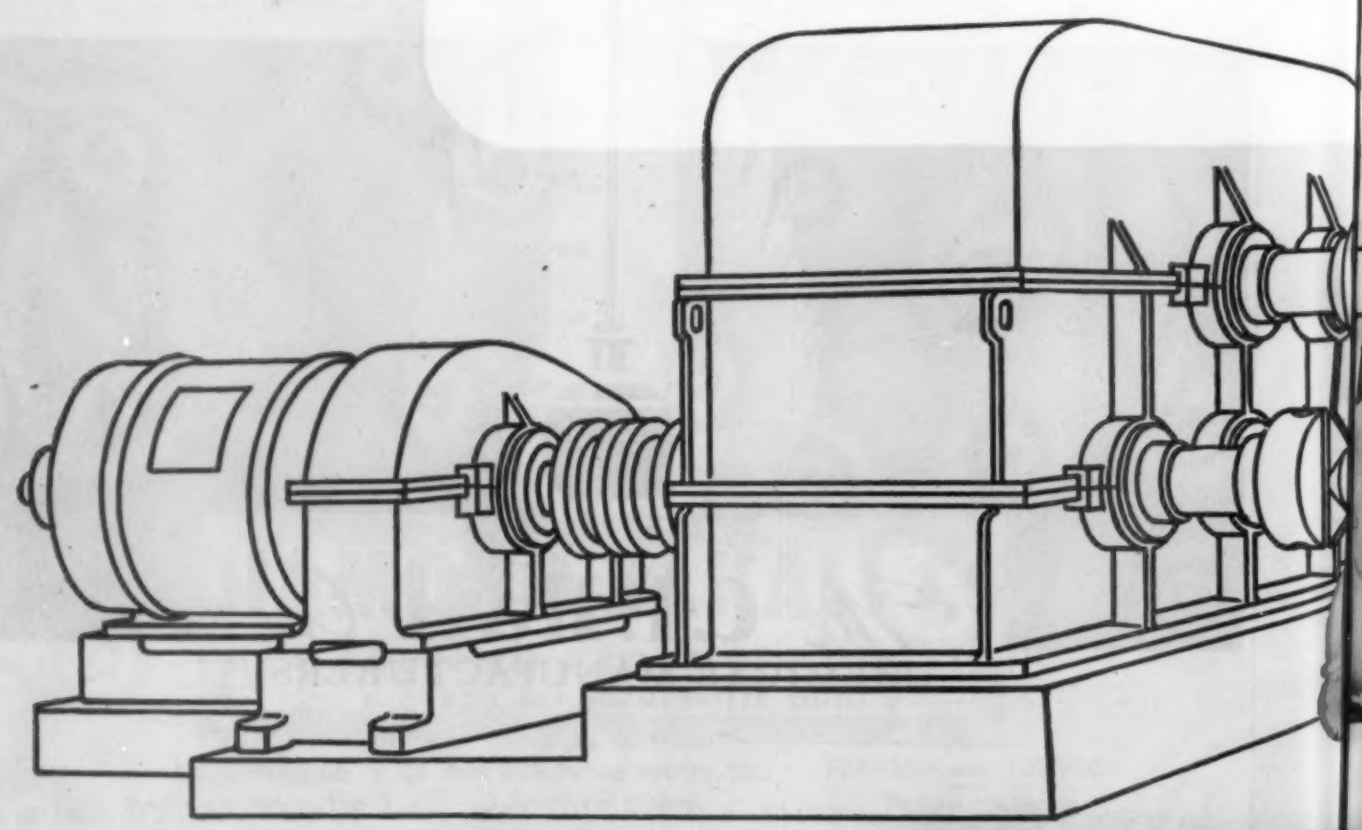
THE NEW FARREL-BIRMINGHAM Z

Engineered to enhance accuracy, uniformity, quality and operating control . . . .

This *first* Z-type, four-roll calender represents the most significant advance in calender design since Farrel-Birmingham first built calenders for the rubber industry in 1854.

Here is a brief summary of its outstanding features:

1. THE "Z" ARRANGEMENT OF THE ROLLS offers a number of advantages in the production of film to accurate, uniform gauge.
2. HYDRAULIC PRELOADING DEVICES anchor the rolls in their fixed, loaded positions, in bearings of the improved, precision sleeve type.
3. DRIVE AND CONNECTING GEARS are eliminated from the calender itself. The gears are enclosed in a separate fabricated steel housing and are coupled to the rolls with smooth-operating universal spindles.
4. ROLLS are chamber-bored and drilled under the working surface for the most effective temperature control. Means for varying the crown can be built in if desired.



Farrel-B

TYPE FILM CALENDER

5 ROLL JOURNALS are flood-lubricated and have improved oil seals to safeguard against oil leakage.

This is another example of the type of engineering that has made Farrel-Birmingham the leader in producing processing equipment for the rubber and plastics industries.

FB-369

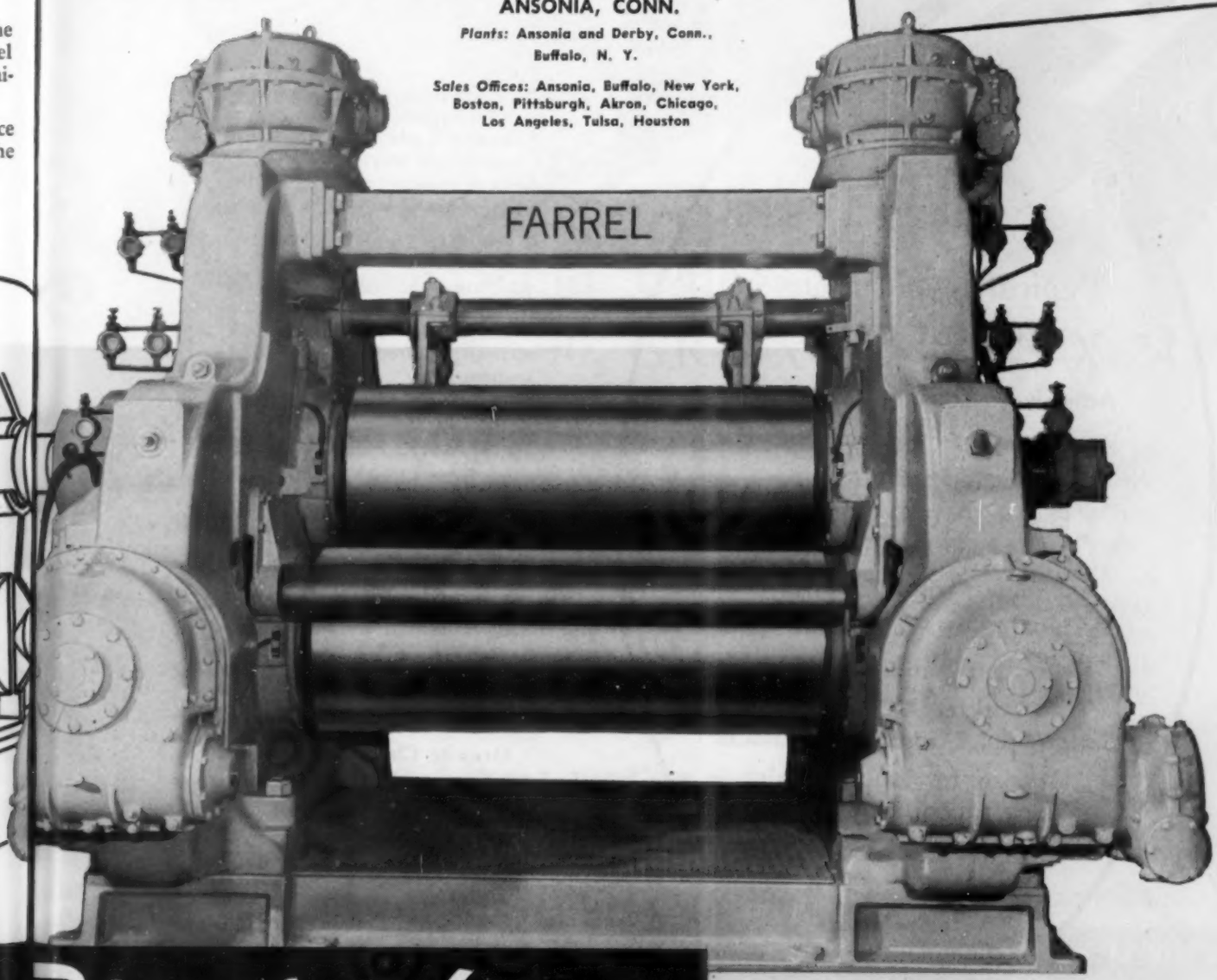
Arrangement of rolls in the new Farrel - Birmingham Z-type film calender

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston



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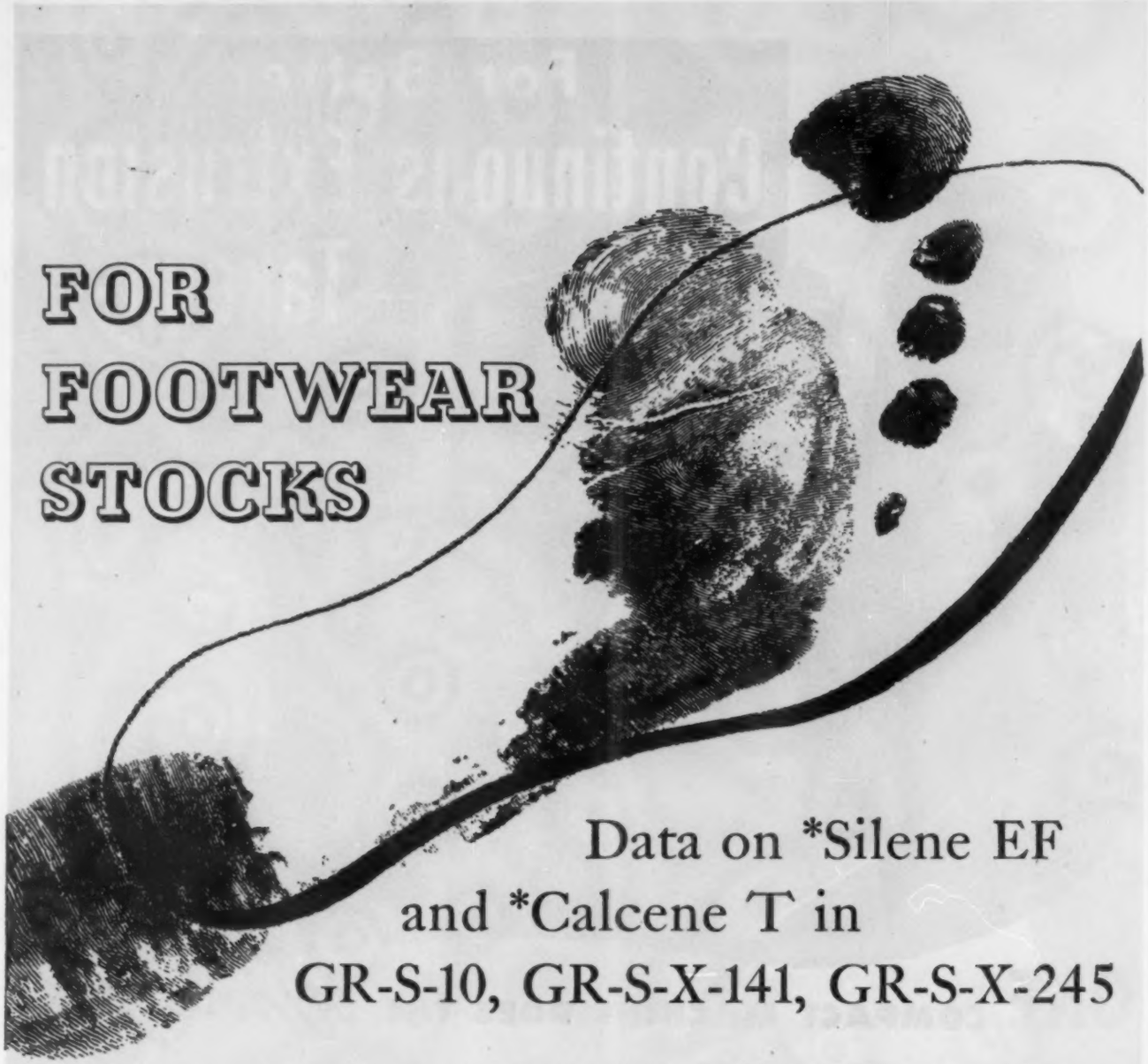

FOR FOOTWEAR STOCKS

Data on *Silene EF and *Calcene T in GR-S-10, GR-S-X-141, GR-S-X-245

Because of the widespread use of Silene EF and Calcene T in footwear and the interest of this branch of the rubber industry in special GR-S polymers, Columbia has made a study of the compounding characteristics of these pigments in three "tailor-made" polymers and their blends with GR-S.

Data compiled from this study is now available to footwear compounders. Just write for Columbia Pigments Data Sheet No. 47-7 . . . address Pittsburgh Plate Glass Company, Columbia Chemical Division, Fifth Avenue at Bellefield, Pittsburgh 13, Pa.

*®

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For Better Continuous Extrusion Takeup...

ONE COMPACT MACHINE DOES THE *Whole Job!*

That's all it takes—just *one* compact machine to perform all the functions involved in continuous extrusion takeup operations. There is no need for separate capstans, lineshafts, tension stands or other propelling and winding equipment.

This new type constant tension continuous takeup with integral capstan and drive was developed as the result of many years of experience by IOI engineers in the design of winding equipment.

The machine features an adjustable constant tension reel drive and an ingenious and efficient system of loading and unloading reels without interrupting the winding process. A cantilevered demountable alloy shaft assembly makes reel loading and unloading a simple and easy operation that eliminates the possibility of damaging the reel flanges.

Precision traverse mechanisms of various types developed by IOI to level lay wire provide either automatic or manual crossover from full to empty reel. Standard traverse for high speed extrusion operations, as illustrated above, has single large diameter reversing screw with wide lay range and stroke adjustment.

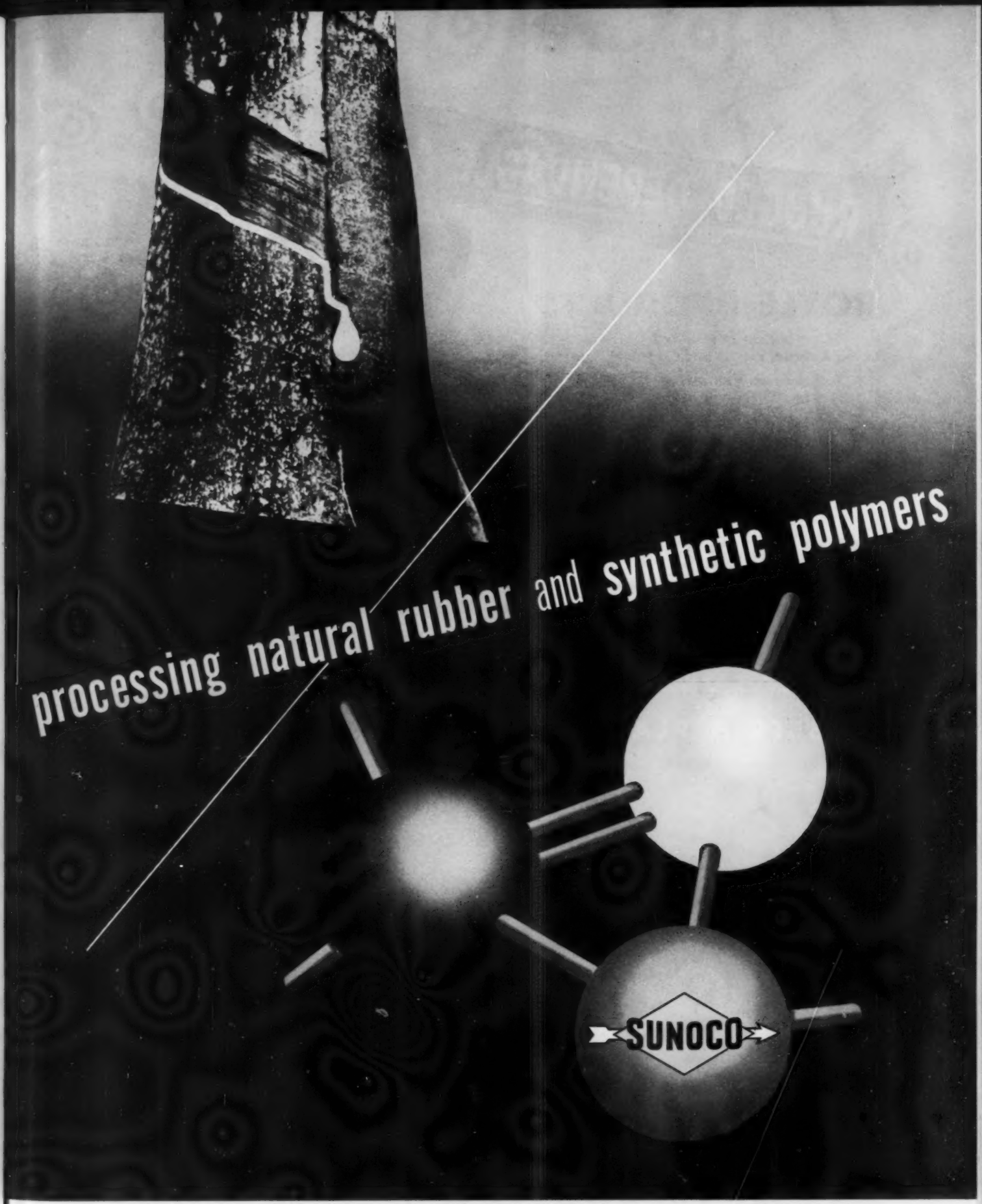
For smooth propulsion of wire tubing or monofilament, IOI takeups employ large, easily threaded, positive grip driving capstans with fleeter sheaves. Capstans are lightweight, precision-machined, and balanced dynamically for top operating speeds. Capstan and reel drives are hydraulically synchronized so that one speed adjustment controls both.

For complete detailed information on this new takeup machine—as well as other recent IOI developments in continuous extrusion equipment—write for "Blueprint for Industry" Part IV, fully illustrated with photographs and engineering drawings. It's free for the asking.

INDUSTRIAL IOI ENGINEERING VERSATILITY OVENS, INC.

13825 TRISKETT ROAD CLEVELAND 11, OHIO

ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON W.1, ENGLAND



new bulletin now available

"Processing natural rubber and synthetic polymers" is the title of a new, 24-page bulletin, with formulas, just released by Sun Oil Company. For your free copy, write Department RA12, Sun Oil Company, Phila. 3, Pa.

RUGGED-DEPENDABLE-ADAPTABLE

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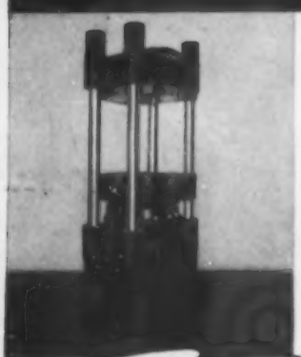
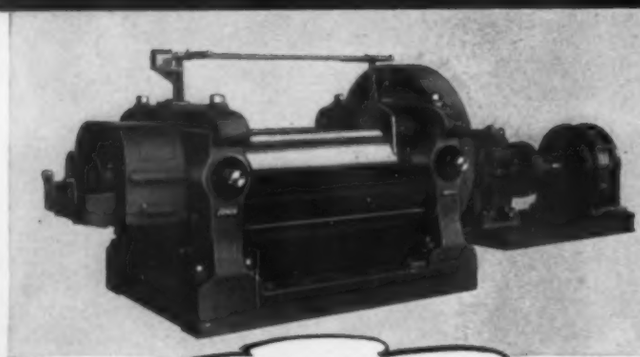


PRESSES



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LABORATORY MILLS

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WASHERS • CRACKERS
CALENDERS • REFINERS

Three outstanding features are found in EEMCO Rubber and Plastics Processing Machinery. First, Correct Design; second, Sturdy Dependability; third, Built for Heavy Duty and Long Life with minimum repairs. Mills, Crackers, Refiners and Washers are furnished as single units, or for operation "in line" of two or more.

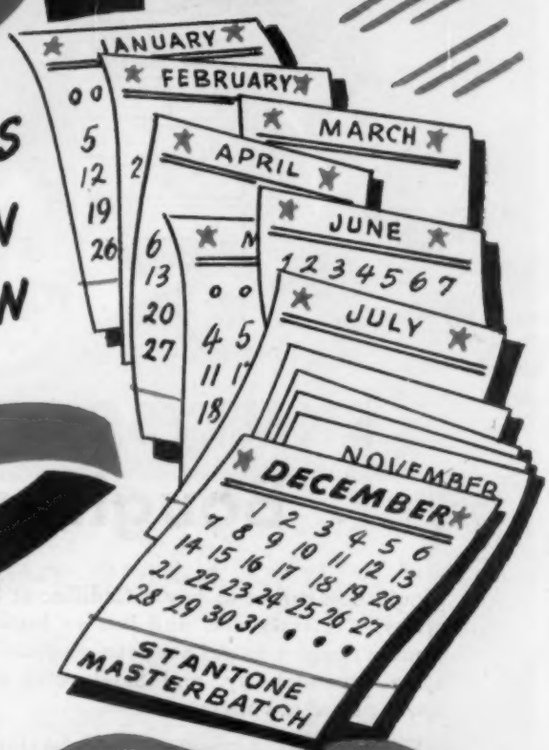
EEMCO Presses are made from 12" x 12" for Laboratory use up to sizes to meet all requirements. The New EEMCO Laboratory Mill (illustrated) is a fully enclosed, self-contained unit with variable speed drive. Streamlined, it is ideal for Laboratory and Small Production. Bulletins sent on request. *Write today for quotations & delivery.*

EEMCO ERIE ENGINE & MFG. CO.

953 EAST 12th ST., ERIE, PENNA.

STANTONE MASTERBATCH COLORS

Complete RANGE OF COLORS
Always THE SAME IN
COLOR INTENSITY YEAR IN
AND YEAR OUT....



STANTONE MASTERBATCH presents compounding colors in a new way . . . Concentrated color dispersed in a quickly compatible thermo-plastic medium — standardized in color intensity. With STANTONE MASTERBATCH finished products never vary in color density or hue. Mills may be changed from one color batch to another without intermediate cleaning . . . STANTONE MASTERBATCH Colors save costly experimentation, so often necessary with dry pigments due to natural variations in color intensity. STANTONE MASTERBATCH Colors make color compounding mathematically accurate in matching correct color specifications . . . Many manufacturers today are adopting STANTONE MASTERBATCH COLORS for better coloring, greater color-compounding efficiency and economy.

A complete range of colors are now available in MASTERBATCH or dry pigment form . . . Write for complete data on color compounding with STANTONE COLORS — for Rubber and Plastics.

HARWICK STANDARD CHEMICAL CO.
AKRON 8, OHIO
Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

"There Isn't Any Santa Claus"

SKELLYSOLVE Quality Can't Be Bought at a Lower Price

Would you expect to buy a Cadillac at Chevrolet prices? Certainly not, and just as logically, you wouldn't expect to get Skellysolve quality, Skellysolve dependability, and Skellysolve service in lower priced naphthas.

Whenever you encounter a naphtha claimed to be "as good as" or "better than" Skellysolve, but which is offered at a lower price, ask yourself: "Can I be certain of its quality and purity? Will it do the job effectively and economically? Can I count on rapid delivery and good service on all orders? Can its supplier help me out in a pinch? If its dependability, quality, and service are just as satisfactory as Skellysolve, why is it necessary for this other solvent to be offered on a 'cut price' basis? Will the supply be dependable year after year? Can I be sure of a uniform product? Will this 'cut price' solvent be available a year or two from now? If I do not obtain prompt delivery or if inferior material is received, how much will it cost in my operating results and how much will it embarrass my shipping schedules?" There isn't any question about the quality, dependability, and service of Skellysolve, because its record for the past 16 years proves its excellence. What's more, Skelly is constantly expanding its facilities in order to produce more Skellysolve as the demand grows.

Remember—Skelly Oil Company was the first large volume producer of hexane, heptane, and octane type solvents, and has faithfully served the rubber, oil and fat, ink, lacquer, and other industries with dependable Skellysolve during all these years.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL COMPANY

SKELLY BLDG., KANSAS CITY, MISSOURI

Season's Greetings
MAY '48 BRING YOU
THE BEST IN HEALTH
AND PROSPERITY!
H. MUEHLSTEIN & CO.
INC.
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BRANCH OFFICES: Akron • Chicago • Boston • Los Angeles • Memphis
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Detroit 2, Mich., 501 Stephenson Building

Los Angeles 21, Calif., 1315 E. 7th Street

New Orleans 12, La., 731 Whitney Natl. Bank Bldg.

New York 1, N. Y., Empire State Building

Philadelphia 3, Pa., 1617 Pennsylvania Blvd.

Portland 4, Ore., 717 Lewis Building

Providence 1, R. I., 200 Grosvenor Building

Rochester 4, N. Y., 70 Exchange Street

St. Louis 10, Mo., 4030 Chouteau Avenue

San Francisco 4, Calif., 405 Montgomery Street

Toronto, Ontario, Canada, 250 Van Horn Street

STEIN SH HALL

285 MADISON AVENUE NEW YORK 17, N. Y.

EST 1866

accelerators

Santocure*
El-Sixty*
Ureka*
Ureka C
Ureka Blend B
Thiotax (2-Mercapto benzo thiazole)
Thiofide* (2, 2' dithio-bis benzo thiazole)
A-10
A-19*
A-32
A-77*
A-100
Diphenylguanidine (D.P.G.)
Guantal*
R-2 crystals
Pip-Pip
Thiurad* (Tetra methyl thiuram disulfide)
Ethyl Thiurad (Tetra ethyl thiuram disulfide)
Mono Thiurad* (Tetra methyl thiuram mono sulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan* (Zinc salt of diethyl dithiocarbamic acid)
Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

everything you need!

antioxidants

Flectol* H
Santoflex* B
Santoflex BX
Perflector*
Santowhite*
Santovar* A

miscellaneous materials

Thiocarbanilide ("A-1")
Insoluble Sulfur "60"
WETTING AGENTS
STABILIZERS
COLORS
REODORANTS

For complete information on any of these Monsanto products, or experienced assistance in your particular rubber chemical problems, address: MONSANTO CHEMICAL COMPANY, Rubber Service Department, Second National Bldg., Akron 8, Ohio.

*Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

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STEIN HALL

285 MADISON AVENUE NEW YORK 17, N. Y.

EST 1866

accelerators

Santocure*
El-Sixty*
Ureka*
Ureka C
Ureka Blend B
Thiotax (2-Mercapto benzo thiazole)
Thiofide* (2, 2' dithio-bis benzo thiazole)
A-10
A-19*
A-32
A-77*
A-100
Diphenylguanidine (D.P.G.)
Guantal*
R-2 crystals
Pip-Pip
Thiurad* (Tetra methyl thiuram disulfide)
Ethyl Thiurad (Tetra ethyl thiuram disulfide)
Mono Thiurad* (Tetra methyl thiuram mono sulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan* (Zinc salt of diethyl dithiocarbamic acid)
Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

everything you need!

antioxidants

Flectol* H
Santoflex* B
Santoflex BX
Perflectol*
Santowhite*
Santovar* A

miscellaneous materials

Thiocarbanilide ("A-1")
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*Reg. U. S. Pat. Off.

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CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MAN WANTED!

Must know how to push button!

WHERE uniform high quality demands that nothing be left to chance, you can depend on this Taylor Control System. It gives you *complete control* of sequence and duration of operations plus *complete control* of platen temperature and condensate removal. Once the operator pushes a starter button, here's what this system does:

1. Controls all timing sequences from the moment the press is started until the finished product is ready for removal.

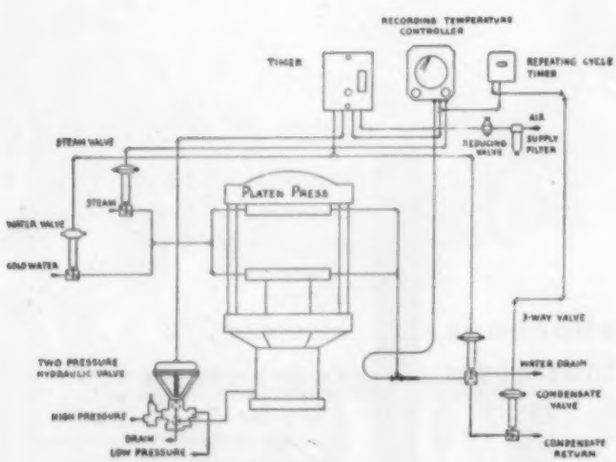
2. Controls temperature during the heating cycle. Also controls automatic change-over to cooling (where necessary) at the end of the molding period.

3. Provides automatic removal of condensate during the heating cycle, requiring no separate traps.

4. Provides automatic "bumping" or "gassing" (when necessary).

This system is so flexible that you can change the time cycle without cutting of cams. And you can change the molding period independent of the balance of the cycle by means of the Auxiliary Timer. *And*, the Fulscope Temperature Controller is fully adjustable for all temperature changes within its range. Interested? Ask your Taylor Field Engineer! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

▼ ▼ ▼



Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow and liquid level.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

IF IT'S COUMARONE RESINS YOU WANT...

you're on the right track, with

The NEVILLE Line

◀ The Direct Route to Quality

Why not write for samples and prices?

. . the most complete, from the lightest to the darkest color, from the highest melting point to the lowest!

A-26

THE NEVILLE COMPANY

PITTSBURGH 25, PA.

Chemicals for the Nation's Vital Industries

BENZOL • TOLUOL • CRUDE COAL-TAR SOLVENTS • HI-FLASH SOLVENTS
COUMARONE-INDENE RESINS • RUBBER COMPOUNDING MATERIALS • TAR PAINTS
WIRE ENAMEL THINNERS • PHENOTHIAZINE • ALKYLATED PHENOLS
RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Nevada

- *Variety of metals, minerals and ores of value to industry*
- *Power and irrigation projects*
- *Good living conditions*
- *Colorful scenic attractions*
- *Excellent rail transportation*

* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

Manufacturers, packers and processors will find Nevada a storehouse of raw materials. There are deposits of copper, silver, gold, zinc, lead and uranium. Mineral ores and minerals include tungsten, manganese and antimony ore, magnesite, gypsum, sulphur, borax and vanadium. Building stone and marble also are available.

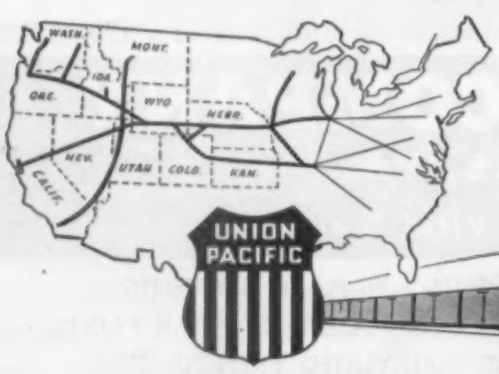
Cattle, sheep and poultry raising are expanding agricultural pursuits and there also is some production of a variety of grains, vegetables and fruits.

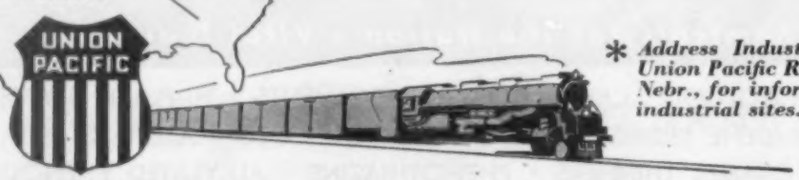
Irrigation and power are supplied by several Federal projects including famous Hoover Dam.

Nevada's healthful climate, excellent educational system, and a variety of scenic attractions contribute to the advantages of living in this western area.

Each year, thousands of vacationists visit gigantic Hoover Dam, beautiful Lake Mead and near-by picturesque Las Vegas.

Union Pacific provides top-notch freight and passenger transportation so essential to a State's industrial development.





* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebr., for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

Did you remember to investigate the cost-saving advantages of...

INDONEX

REG. U.S. PAT. OFF.

PLASTICIZERS

The advertisements illustrated appeared in leading rubber industry publications. Follow your favorite publication for latest developments in the INDONEX line.

INDOIL
CHEMICAL PRODUCTS

STANDARD OIL COMPANY (INDIANA)
Chemical Products Department
910 South Michigan Avenue **Chicago 80, Illinois**

General results obtainable with INDONEX in natural and synthetic rubbers have been described in our Bulletin No. 13, while various other specific applications of INDONEX are discussed in the following Circulars. Check the circulars you want, clip the list to your letterhead and mail.

☐ 13-1—Butyl Rubber Compounds ☐ 13-2—Butadiene-Acrylonitrile Copolymer Compounds ☐ 13-3—Neoprene Compounds
☐ 13-4—Tire Carcass Compounds ☐ 13-5—Footwear & Heel Compounds ☐ 13-6—Camel Back
☐ 13-7—Motor Mount & Bumper Compounds ☐ 13-8—Wire Jacket and other Extruded Compounds
☐ 13-9—GR-S Packing Compounds ☐ 13-10—Hose Compounds ☐ 13-11—Hard Rubber Compounds
☐ 13-12—Low Hardness Mechanical Goods ☐ 13-13—Neoprene Mechanical Goods ☐ 13-14—Hycar or-15
☐ 13-15—Natural Rubber—Reclaim Mechanical Goods and Carcass Compounds

RECIPE

(Test No. 7447 from the Barrett Rubber Research Laboratory)

FOR

NATURAL RUBBER COMPOUND

With a Shore A Hardness of 65 for Molded and Extruded Goods

This recipe uses the advantages of CUMAR* resin to produce a mineral-filled natural rubber compound of low cost and good physical properties for molded and extruded goods. The compound has relatively low viscosity, resulting in excellent processing; is free from scorch tendencies and is readily extruded; and although highly loaded, produces a rubbery and snappy vulcanizate with good aging characteristics.

Tension and Hardness Data:
Press Cure: 10 Minutes at 316°F (70 lb.)

	Unaged	Aged 14 Days at 70° C
Tensile—P.S.I.	1350	1400
Elongation—%	460	430
Hardness—Shore A	65	72

RECIPE	WEIGHT BASIS
Smoked Sheets	100.00
"CUMAR" Resin, MH 2½ Grade	15.00
Clay (Hard)	100.00
Calcium Carbonate (Precipitated)	100.00
Zinc Oxide	5.00
Stearic Acid	2.00
SUNPROOF	2.00
AMINOX	0.25
Red Oxide	4.00
Sulfur	3.00
ZENITE B	1.50
TOTAL	**332.75**

Mooney Viscosity (Large Rotor) 4 minutes at 212°F	30
Specific Gravity	1.61
Rubber Hydrocarbon, % by Wt.	30.1
Rubber Hydrocarbon, % by Vol.	52.5
Cost Per Pound	$0.08 (Approx.)

Mooney Scorch Test Data at 250°F (Small Rotor):

Minutes	Viscosity
1	16
10	16
20	18

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

In Canada: The Barrett Company, Ltd.,
5551 St. Hubert St., Montreal, P. Q.

*Reg. U. S. Pat. Off.

DIISOBUTYL KETONE

Ketones

ETHYL BUTYL KETONE

Available in commercial quantities —to give you formulating freedom in the manufacture of lacquers and synthetic resin coatings.

FORMULA	Diisobutyl Ketone $C_4H_9COC_4H_9$	Ethyl Butyl Ketone $C_4H_9COC_2H_5$
Boiling Point at 760 mm. Hg	168.1°C.	147.8°C.
Toluene Dilution Ratio at 20°C.	1.5	2.6
½ sec. R.S. Nitrocellulose Viscosity, 18% "Vinylite" resin VYHH Solution	Gel Structure	112 cps
Evaporation Time (Butyl Acetate = 8 hr.)	44 hr.	14 hr.
Weight per gal. at 20°C.	6.73 lb.	6.8 lb.
Specific Gravity at 20/20°C.	0.8089	0.8197

DIISOBUTYL KETONE

Dispersant—Best all around resin dispersant available for making organosols based on VINYLITE resin VYNV. Makes possible semi-hard and hard metal coatings containing little or no plasticizer, and aids in the preparation of highly plasticized coatings for cloth and paper.

Solvent—Retards premature evaporation in brushing lacquers, and reduces blushing in air-dried lacquers. Gives better flow-out and gloss to baked finishes.

ETHYL BUTYL KETONE

Dispersant—Produces fluid organosols having good viscosity stability on aging. Permits high solids content and makes good, clear films without checking ("mud cracking").

Solvent—Good solvent in both air-dried and baked finishes based on nitrocellulose or vinyl resins. Less active in lifting undercoats.

Intermediates—When condensed with amines and other chemical groups capable of reacting with the carbonyl group, these ketones give compounds of interest as inhibitors, rubber accelerators, dyes, pharmaceuticals, and insecticides. Ask for technical literature on diisobutyl ketone F-6934, and ethyl butyl ketone F-6918 —when writing please address Dept. N-12

The word "Vinylite" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

CARBIDE and CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Principal Cities

In Canada:

Carbide and Carbon Chemicals, Limited, Toronto

Technical Bulletin No. 39 — on the Compounding of GR-S with Substantial Loadings of ZINC OXIDE

GR-S-16 with 100 Parts of Zinc Oxide
Effect of Sulfur Variation

(Refer to Technical Bulletins Nos. 28 and 29)

The interest developed in X-272 has resulted in its being made a special purpose polymer designated as GR-S-16. It is defined by *Rubber Reserve* as follows: *Mooney ML-4-212° F., 95-105; Soap Emulsifier, Rosin Acid; Stabilizer, Stalite; Coagulation, Glue-Acid; Approximate Monomer Charge Ratio, 71/29 Butadiene/Styrene.*

COMPOUND NO. 39

GR-S-16	100.0
Sulfur	Variable
MBTS	0.79
Santocure	0.33
Coumarone-indene Resin	3.0
E.L.C. Magnesia	5.0
ZINC OXIDE	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
1.19 PARTS SULFUR										
7.5	40	1190	40	40	40		1.60	38	27	11
15	1310	965	80	120	200	275	.33	43	178	61
30	1960	770	200	280	400	600	.19	49	99	52
45	1940	735	240	355	515	750	.19	50	97	52
60	2060	750	200	275	395	595	.18	50	95	50
90	1940	770	160	240	355	515	.18	50	95	50
2.00 PARTS SULFUR										
7.5	75	1140	40	40	40	75	1.36	40	50	20
15	1665	785	160	200	315	515	.20	45	87	51
30	1820	695	240	355	515	830	.18	50	82	41
45	1680	625	240	400	600	960	.14	52	84	48
60	1570	610	235	350	550	900	.15	52	92	47
90	1920	670	245	325	530	900	.16	52	82	48

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indentation in mm.	Per Cent Rebound	Hardness: Shore	Rex	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression: Initial	Final	Cut-Growth Resistance: Tested at 70° C. Inches Failure 10,000 Cycles
1.19 PARTS SULFUR										
60	7.30	49.5	50	55	35.0	B.O. —20'	106.5+ (At 5'—45.6)	25.1	45.2	.77
2.00 PARTS SULFUR										
60	7.15	50.0	53	56	31.4	53' —34.0	87.4 (At 5'—33.2)	19.7	39.9	.67

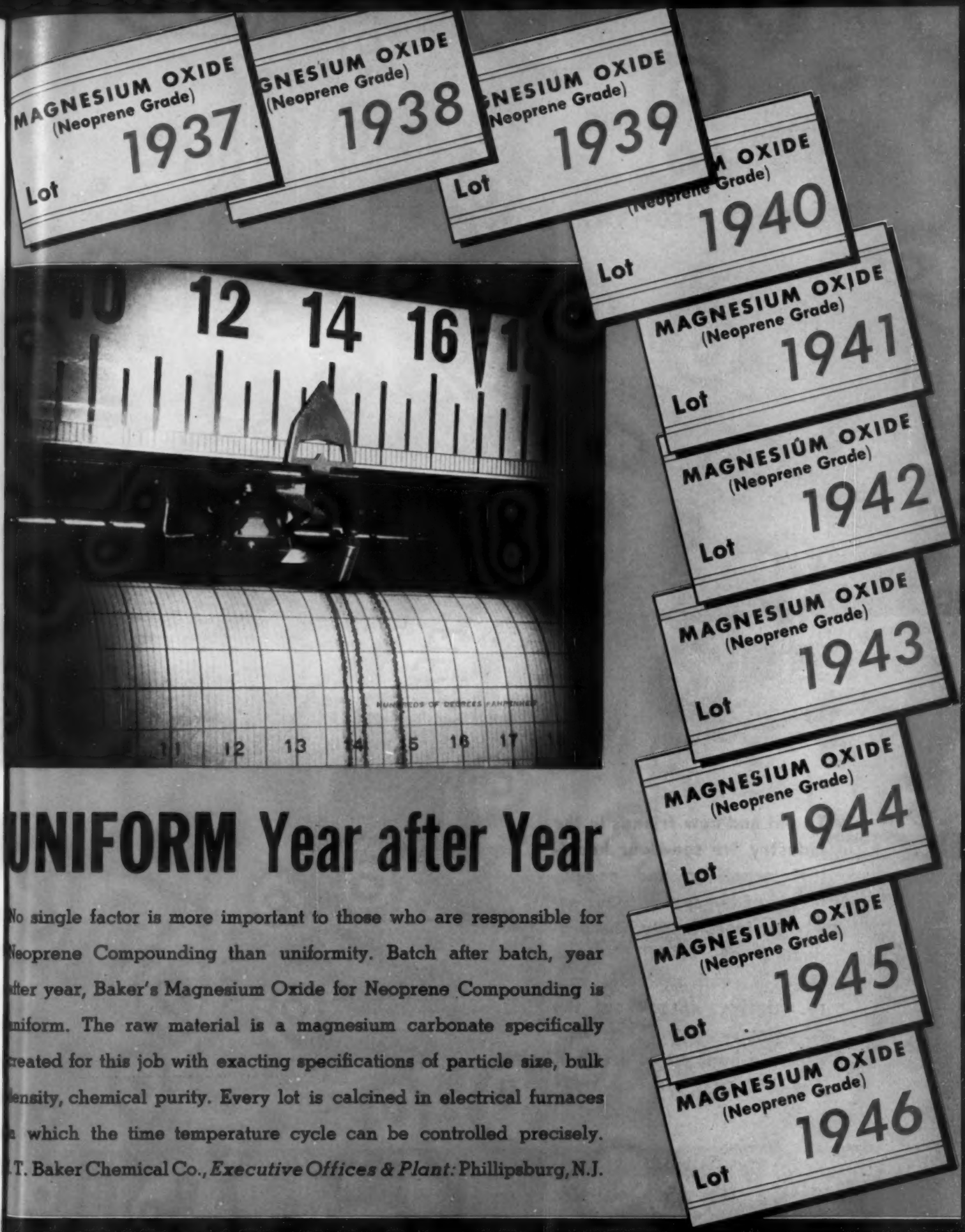
*Test Conditions: 143 Lb. Load. 0.175" Stroke. 100° C. Oven Temp.

THE MBTS—Santocure acceleration follows German carcass stock practice previously referred to in *Technical Bulletin No. 22.* Reversion was noted in this compound and is also evident in the present tests.

The effect of sulfur content in Zinc Oxide compounds on tensile strength and tear resistance is quite striking as has been noted previously. The increased sulfur content produces only a small increase in pendulum rebound but under the severe operating conditions of the Goodrich Flexometer, the higher sulfur compound showed lower temperature rise. The cut-growth resistance of these compounds is excellent.

With this acceleration, GR-S-16 does not develop the high modulus values noted for X-272 with "El-Sixty-DPG" acceleration (Technical Bulletin No. 28) and for other high Mooney polymers.

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by THE NEW JERSEY ZINC SALES COMPANY
NEW YORK • CHICAGO • BOSTON • CLEVELAND • SAN FRANCISCO • LOS ANGELES



UNIFORM Year after Year

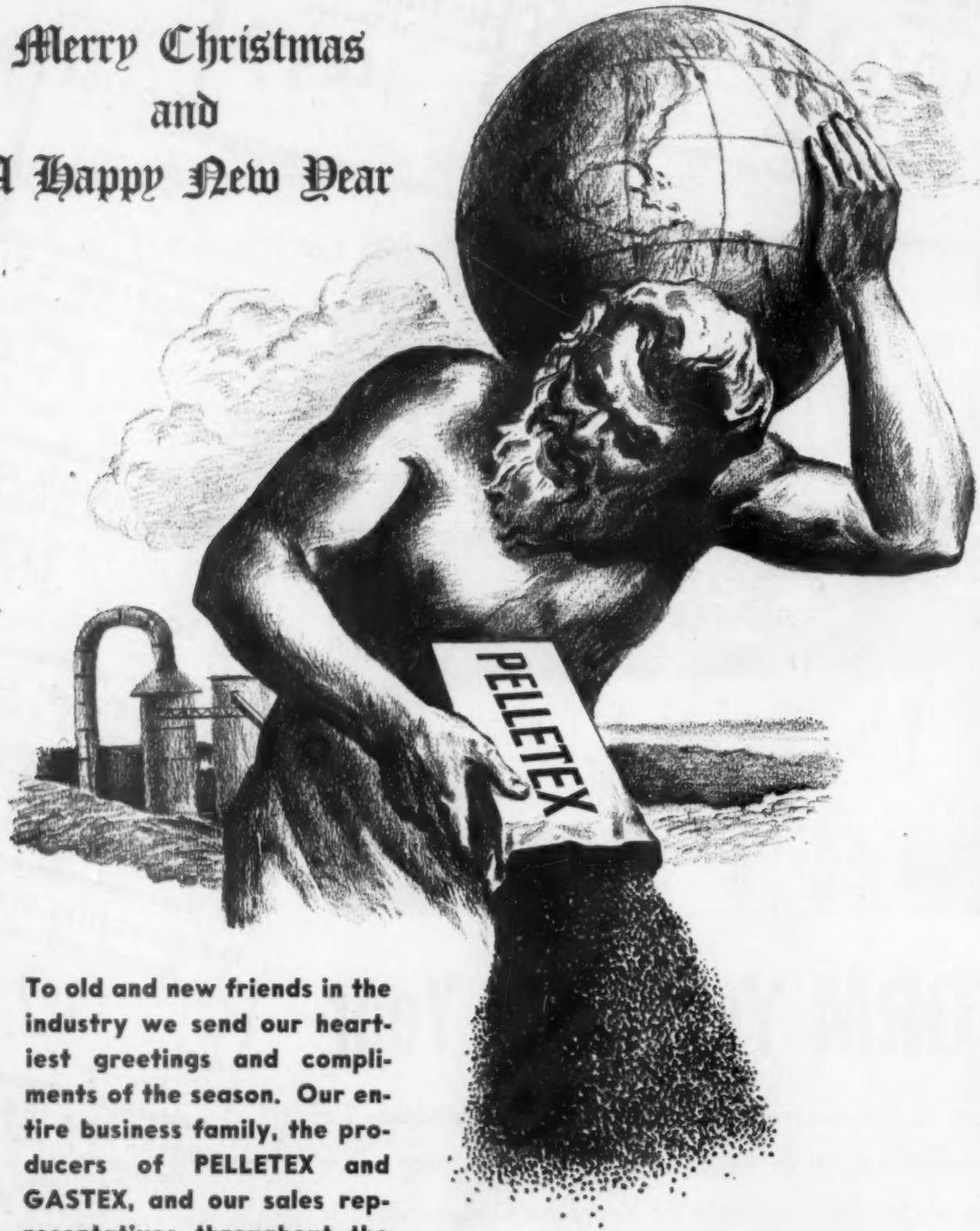
No single factor is more important to those who are responsible for Neoprene Compounding than uniformity. Batch after batch, year after year, Baker's Magnesium Oxide for Neoprene Compounding is uniform. The raw material is a magnesium carbonate specifically created for this job with exacting specifications of particle size, bulk density, chemical purity. Every lot is calcined in electrical furnaces in which the time temperature cycle can be controlled precisely.

J. T. Baker Chemical Co., *Executive Offices & Plant:* Phillipsburg, N.J.

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

Merry Christmas and A Happy New Year



To old and new friends in the industry we send our heartiest greetings and compliments of the season. Our entire business family, the producers of PELLETEX and GASTEX, and our sales representatives throughout the country, send you best wishes for a happy and prosperous 1948.

MANUFACTURER
GENERAL ATLAS CARBON CO.
PELLETEX GASTEX
PAMPA, TEXAS
GUYMON, OKLA.

DISTRIBUTOR
HERRON BROS. and MEYER
NEW YORK, N. Y.
AKRON, OHIO

AVAILABLE IN CARLOADS

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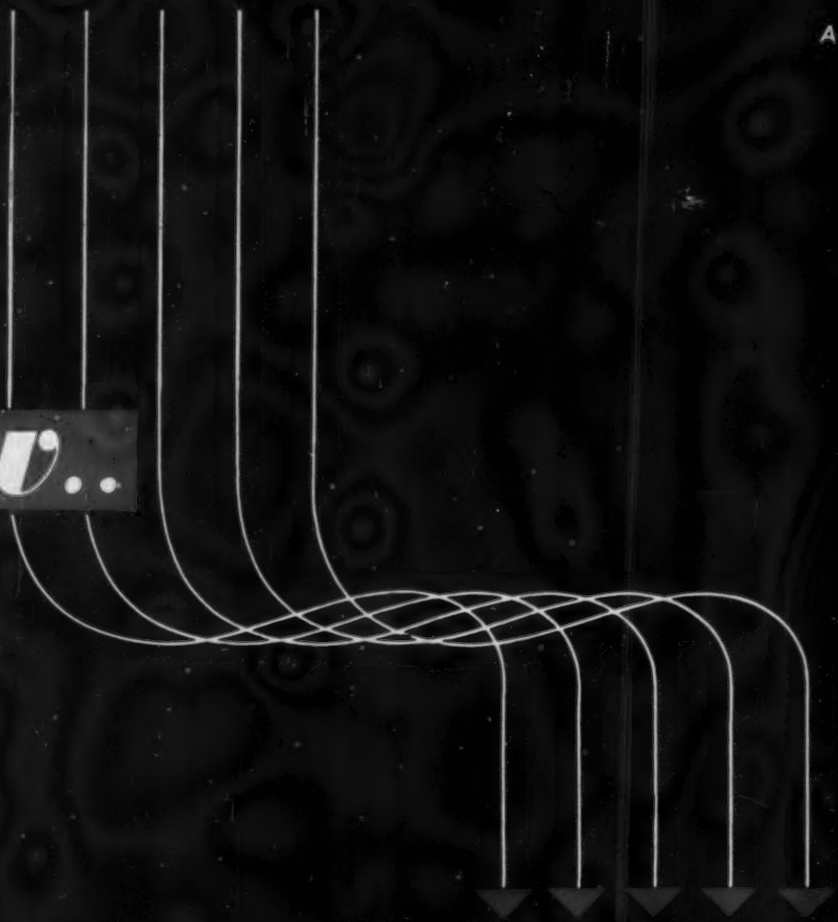

STERLING S O

Smooth-Out

Sterling SO is a Smooth-Out furnace black developed by Godfrey L. Cabot, Inc., just approved for sale after extensive tests in rubber plants.

This new Cabot carbon black is in the high modulus range in properties and price, with Smooth-Out properties. Sterling SO is in production and is available to rubber manufacturers now in carloads.

Write for technical data on the new Cabot carbon black — Sterling SO — Smooth-Out.

CABOT

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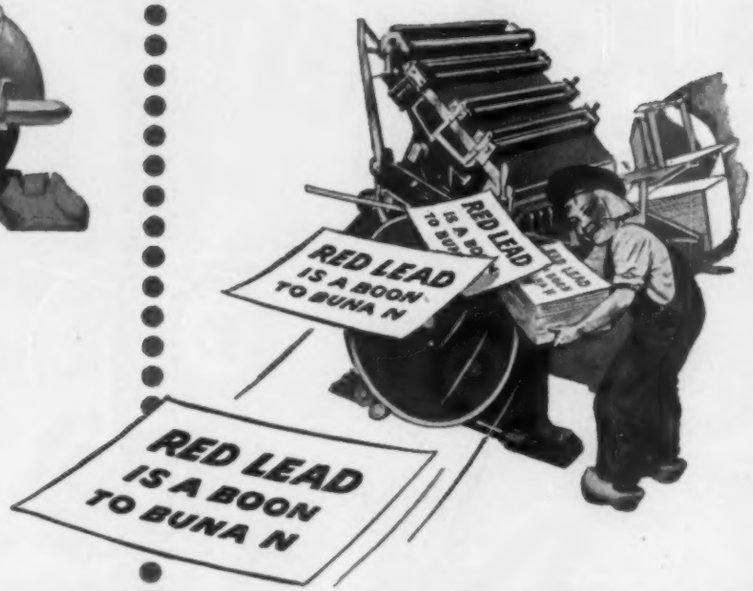
From Oil-Proof Soles to Printers' Rolls



Dutch Boy: "Yes Sir . . . Red Lead is a boon to buna N products."

Plant Chemist: "But just what does it do?"

Dutch Boy: "Briefly, it gives you definitely improved properties at lower cost."

Plant Chemist: "Can you back up that statement?"

Dutch Boy: "Absolutely! Exhaustive tests, fully confirmed by the experience of users, prove beyond any question, that compounding buna N with #2 RM Red Lead gives the five, very real advantages we've listed at the right."

Plant Chemist: "Very interesting! Where can I get further information?"

Dutch Boy: "Just let us know your specific application and our technical staff will gladly supply literature and any other information you need. Drop a line to the Rubber Division of our Research Laboratories, 105 York Street, Brooklyn 1, New York."

Plant Chemist: "One more question. Is buna N the *only* rubber Red Lead improves?"

Dutch Boy: "By no means. Red Lead improves most rubber products, no matter whether your base is GR-S, GR-S-10, GR-M or GR-I. Just remember, if it's made with rubber it's better made with Red Lead."

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2. *Decreased Cost*
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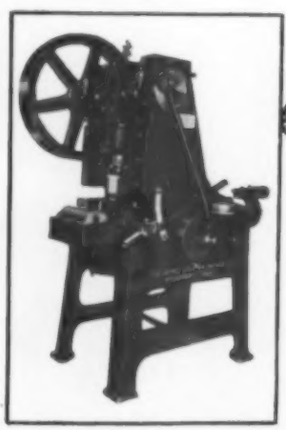
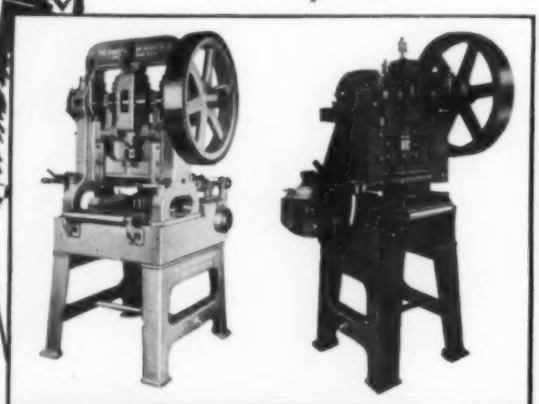


MODEL A-1



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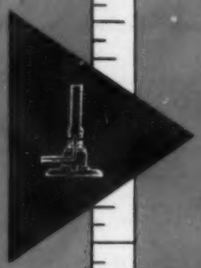

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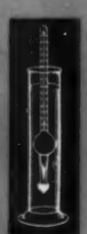

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VOLUME 62
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RUBBER AGE

Vol. 62, No. 3 DECEMBER, 1947

The Development and Availability of Experimental and General Purpose GR-S Polymers

By RICHARD E. HARMON

Research and Development Division, Office of Rubber Reserve, Washington 25, D. C.

An indication of the effort being expended by the Office of Rubber Reserve to cooperate with the rubber manufacturing industry is the fact that over 400 experimental GR-S polymers have already been scheduled, with most of them in actual production. How these polymers came into being, the specific advantages of each of them, how the Office of Rubber Reserve is cooperating with industry, and what industry can do to help itself in the development of still better general and specific polymers is covered in the accompanying article, presented by the author at the Rubber Conference of the Pacific Chemical Exposition in San Francisco, Calif., on October 24, 1947.—Editor.

THE Reconstruction Finance Corporation, Office of Rubber Reserve, has established a Technical Service Section in the Research and Development Division during the past year. The functions of this Section include the preparation of technical bulletins and information for release to the rubber industry both directly and through publication in the rubber trade journals. In addition, assistance in the development of special purpose GR-S polymers is provided so that a maximum number of companies can share in the newer developments.

By October, 1947, 411 experimental GR-S polymers had been scheduled and most of them have actually been made in regular production equipment in the various copolymer plants operated by Agents for the Office of Rubber Reserve. Twenty-eight of these experimental GR-S polymers have graduated into the numbered GR-S classification, such as GR-S-10, GR-S-50, etc., as special purpose American made rubbers. This number includes also the GR-S latices, Types I through V.

The approximate relative production range of the various types of GR-S is illustrated in the following breakdown based on production levels from March through August, 1947, as a percentage of the total:

	Percentage
Standard GR-S	30 to 40
GR-S-10 and GR-S-10AC	20 to 30
GR-S-Blacks	8 to 15
GR-S-Latices	4 to 6
Other Specials	15 to 23
Experimental (X-Numbered GR-S)	4 to 10

This breakdown focuses attention to the fact that GR-S is a family of styrene copolymers, practically always with butadiene although with isoprene in an isolated case or so. The name GR-S was originally an abbreviation of Government Rubber—Styrene. Such terminology is not specific as to composition. It is therefore advisable to refer to the types of GR-S by their specific names, such as Standard GR-S, GR-S-25, GR-S-60, etc. The many GR-S types vary considerably in appearance, processing and chemical properties as well as in physical properties when compounded and vulcanized. Under present usage, however, polymers given a GR-S designation would not necessarily have to include styrene since polyisoprene (X-281-GR-S) has already been made and polybutadiene may be made at a future date.

It becomes apparent that, except in case of emergency, the possibilities of a satisfactory general purpose synthetic rubber may be past. No individual type of

synthetic or natural rubber can be expected to be as effective as one which is specifically designed and developed for given applications. However, the possibility for future improvement of the basic polymer, which in many cases has been considered the general purpose synthetic rubber, is encouraging. When significant improvements in the basic polymer are made they will soon be translated into similar improvements in other members of the family of special purpose rubbers. How this can be done will be briefly detailed in this paper. An ultimate aim in polymer development will be to improve individual GR-S polymers so that each may be suitable for a number of uses. This will in effect allow the reduction of the total number of polymers with resultant simplicity and more efficient production scheduling.

The purpose of this paper is to clarify as much as possible any confusion which might have arisen in the consumer's mind because such a large array of rubbers has been made. In addition, it is desired that the rubber industry be acquainted with the methods by which individual companies can participate in group developments. It is hoped that suggestions made in pointing out the properties of particular experimental and Special Purpose GR-S polymers and the factors usually responsible for such properties will be found to be practical in determining the most suitable polymer for specific purposes.

Development of X-Numbered Polymers

Until November, 1946, the entire production of the individual X-numbered polymers was usually underwritten by one company. At that time, technical men from the Office of Rubber Reserve were invited to sit in the Civilian Production Administration (the functions of which have since been absorbed by the Office of Materials Distribution of the Department of Commerce) consulting technical committee meetings. These meetings brought together representatives of the various segments of the rubber industry, such as rubber mountings, hard rubber, wire and cable, tire and tubes, athletic goods, footwear, etc., in individual groups. The industrial members of these committees advised how they felt that GR-S could be improved to best fit their end product use. This constructive criticism resulted in cooperative developments with ten to twenty companies participating. Among the X-numbered GR-S polymers being developed by this procedure are X-389-GR-S, X-392-SP-GR-S, X-393-SP-GR-S, X-399-GR-S and X-405-SP-GR-S. More stable polymers resulted from this method from the standpoint of both the consuming companies and Rubber Reserve, since group developments tended to produce more ready availability for the consumer and constant production for Rubber Reserve.

In view of the difficulty in contacting many companies, particularly those in the Far West, as well as having incomplete information as to the particular type of GR-S developments most interesting to them, it has not been possible to include many consumers in group developments. By acquainting all interested organizations with the procedures and developments already accomplished, all will have the opportunity to participate in future developments. The procedure is to advise the Technical Service Section, Research and Development Division, Office of Rubber Reserve, Reconstruction Finance Corporation, Washington 25, D. C., of the properties most desired. When it appears that such a new polymer is producible, notice will be given and, if sufficient purchase permit requests are forthcoming, production will be scheduled. In many cases it may be found that existing and regularly scheduled numbered or experimental GR-S types are available and satisfactory for the desired use. However, requests for regular production of either X-numbered or GR-S numbered polymers should be directed to the attention of the Sales Division in line with established procedures.

In the development of many polymers, preliminary production in limited quantities for evaluation is made in the pilot plant. Pilot plant reactors vary in size from 5 gallons to 500 gallons. In preparation for pilot plant runs, it is often necessary to study the system in bottle polymerization in the laboratory. Pilot plant polymers are assigned XP numbers when made at the Government laboratories,* operated by University of Akron, agent for the Office of Rubber Reserve, Akron, Ohio. If, after evaluation by industry, these XP-polymers remain of special interest, arrangements may be made to produce them in large scale quantities in reactor units which have a 3,750 gallon capacity. In such a case the latter polymer will be assigned an experimental (X-) number.

It may be worth digressing here to point out that it is always desirable to evaluate thoroughly both pilot plant experimental (XP-) and regular experimental (X-) polymers since the size of the equipment used often imparts somewhat different properties even though the recipe is as similar as possible.

On a number of occasions, requests for descriptions of all experimental polymers have been received. Such a list would have little value other than historical interest since many of them will never be made again. However, new developments continue to be made which, if they fit the needs of the industry, will be authorized as X-numbers and perhaps later become a numbered GR-S.

An experimental (X-) polymer is graduated to the ranks of numbered GR-S types after it has been demonstrated that such a GR-S has been produced in large quantities (200,000 lbs. per month minimum) over a period of three to six months and there appears to be a continuing demand for it. GR-S numbered polymers are more readily available than X-numbered GR-S unless production is interrupted by shortages of raw materials or unusual circumstances requiring the shifting of production from one plant to another.

Normally, when setting up X-numbered polymers for production, it is necessary to obtain a minimum of 60,000 pounds of purchase requests. Larger production runs are preferred, particularly in copolymer plants operating with continuous polymerization systems, since they are more economical and allow the production of a GR-S having the most consistent properties.

Production of Experimental Polymers

Usually experimental polymers are produced only at the request of the consumers, with 20 bales of the original run set aside for distribution to other interested companies for their evaluation. Such rubber is available in quantities of one to two bales upon request to the Sales Division of Rubber Reserve within six months after the experimental polymer was produced. Subsequent production runs are made if sufficient requests are received.

An example of a very late group development is the scheduling of X-413-GR-S as an EPC black masterbatch stabilized with Stalite. This is a relatively non-staining type GR-S-Black-1 (containing 50 parts EPC black per 100 parts GR-S). Such a masterbatch should be suitable

* For description see "Government Laboratories of the Office of Rubber Reserve," *Chemical and Engineering News*, Vol. 24, p. 3024, November 25, 1946.

for any application where GR-S-50 (same as Standard GR-S except for Stalite stabilization) is now satisfactorily used. Reports indicate that Stalite polymers may discolor upon exposure to heat or light after being compounded into colored goods but do not stain appreciably by contact and migration. Thus discoloration in black masterbatches such as X-413-GR-S would be an unimportant property. This group development was the result of several consumers having advised Rubber Reserve of their need for such a non-staining type masterbatch. It was originally scheduled as X-401-GR-S but cancelled because of insufficient interest at the time.

Adjustment Factors Involved

The development of specialty GR-S polymers is in some cases relatively simple as a result of the vast background of information accumulated during the past five years of the Government's Synthetic Rubber Program. From the starting point of Standard GR-S, which was the original general purpose butadiene-styrene copolymer during the war, Special Purpose polymers can be made by adjusting the type and the amount of the one or more of several of the following factors:

1. Monomers* (Charge ratio)

A. 50-50 Butadiene-Styrene:
GR-S-40AC, X-278-SP-GR-S, X-304-GR-S**
B. 65-35 Butadiene-Styrene:
X-212-GR-S
C. 71-29 Butadiene-Styrene:
Standard GR-S and most other types
D. 71-28.5-0.5 Butadiene-Styrene-Divinylbenzene:
GR-S-60, X-344-GR-S, X-393-SP-GR-S, X-405-SP-GR-S
E. 95-5 Butadiene-Styrene:
X-406-SP-GR-S
F. 75-25 Isoprene-Styrene:
X-141-GR-S
G. 100 Isoprene (polyisoprene):
X-281-GR-S

* Does not include GR-S latices.
** 45-55 Butadiene-Styrene charge ratio.

2. Temperature of Reaction

A. Standard procedure 120° to 130° F.
B. Approximately 35° F.:
X-383-GR-S, X-384-GR-S, X-398-GR-S

3. Stabilization

A. PBNA and BLE (Staining and discoloring):
Standard GR-S and other types not listed below
B. Relatively Non-Staining Types:
1. Stalite: GR-S-16, GR-S-18, GR-S-50
2. Hydroquinone: GR-S-21 (formerly X-250-GR-S)
C. Non-staining Types (Letter combinations are trade names and not otherwise descriptive):
1. EFED: GR-S-17, GR-S-25, GR-S-40AC, GR-S-45AC
2. (a) IBUL: X-344-GR-S, X-416-GR-S
(b) UBUB: X-392-SP-GR-S, X-393-SP-GR-S, X-396-GR-S, X-405-SP-GR-S
3. R-2015: X-385-GR-S
4. BC: X-397AC-GR-S

4. Emulsification

A. Fatty Acid Soap: Standard GR-S, GR-S-50, GR-S-25, etc.
B. Rosin Soap: GR-S-10, GR-S-10AC, GR-S-18, GR-S-16, GR-S-17
C. Mixtures of Soap with Synthetic Detergents: X-370-GR-S-Latex, X-359-GR-S-Latex, etc.

5. Coagulation

A. Salt-acid: GR-S, GR-S-50, GR-S-25, GR-S-85, etc.
B. Glue-acid: GR-S-65, GR-S-16, X-392
C. Alum: GR-S-AC, GR-S-10AC, GR-S-40AC, GR-S-45AC
1. Dilute Alum: X-361AC-GR-S

6. Modification

A. Straight chain mercaptans (DDM):
Standard GR-S and majority of other types
B. Tertiary (branched chain) mercaptans (Sulfoles and C_{16}):
X-389-GR-S, X-399-GR-S, X-415-GR-S

7. Finishing operation

A. Standard Plants
B. Naugatuck (combination straining and milling before and after drying, respectively):
GR-S-SP, GR-S-60-SP, GR-S-65-SP, etc.

8. Cross-linking by addition of small quantity of divinylbenzene to copolymer:

GR-S-60, GR-S-60-SP, X-344-GR-S, X-393-SP-GR-S, X-405-SP-GR-S

Properties Imparted by Variation

The specific properties imparted by variations in the foregoing factors which are of primary interest to the consuming rubber industry are generally as follows:

1. Monomer charge ratio variations from 71-29 butadiene-styrene copolymers (Standard GR-S):

A. High styrene (50 parts); Improved thermoplasticity and flow characteristics. Higher tensile, modulus and hardness with increased stiffness in uncured compounds and easier breakdown. Freeze point higher than Standard GR-S.

B. High butadiene: Poor processing and physical properties but lower freeze point.

C. Other monomers which contain polar groups such as acrylonitrile (CN) which when copolymerized with butadiene impart poorer freeze resistance but offer advantages such as oil resistance.

D. Polyisoprene and isoprene-styrene polymers have chemical and aging reactions similar to natural rubber in that they retain elongation on over-cures and have increased tack, resilience, and tear resistance along with lower heat generation and set. Processing characteristics are somewhat poorer than GR-S.

2. Lowering the reaction temperature improves both processing and physical properties when reduced to the vicinity of 35° F. Standard GR-S reaction temperature is between 120° and 130° F. This reduction in reaction temperature would require refrigeration capacity not now available in the copolymer plants.

3. Stabilization is the most important factor controlling the degree of staining and discoloring as well as the aging properties of the polymer. It should be noted that anti-oxidants are incorporated in GR-S to protect or stabilize the raw polymer before compounding rather than to prevent oxidation in the end product. The best

non-staining and non-discoloring stabilizers generally impart the poorest resistance to heat aging.

4. Emulsification is important in the manufacture of GR-S since it is the basis of emulsion polymerization as distinguished from the bulk or mass polymerization. Mass polymerization has been used by the Russians and to a considerable extent by the Germans. Fatty acid soap is the emulsifying agent used in Standard GR-S. Rosin soap emulsification was originally studied in the GR-S polymerization system to avoid possible shortage in the availability of fatty acid soaps. At the present state of development, rosin soap polymers of the GR-S-10 type offer several advantages, such as improved tackiness, better dispersion of non-black pigments, no stearic acid bloom, and slightly better over-all physical properties including improved tear and cut growth resistance and better abrasion resistance. However, it should be noted that it is sometimes necessary to compromise on the properties of a polymer and, in many cases, those offered by fatty acid soap emulsification are favored by a number of the consuming companies.

5. Coagulation of Standard GR-S is accomplished through the use of salt and acid (sulfuric). The ash content of Standard GR-S, coagulated by this technique, is a maximum of 1.50% as prescribed in the Specifications for Government Synthetic Rubbers. A considerable portion of this ash is water soluble. For most uses the inclusion of this ash makes little or no difference in the end-product.

For specialty applications, such as wire and cable, low electrolyte content produces the best results. Glue-acid techniques for coagulation have been developed in which the water soluble ash is kept to a minumum. In this case, this reflects better retention of insulation resistance and other electrical properties. Examples of such polymers are GR-S-65, GR-S-16, X-392-SP-GR-S and X-393-SP-GR-S.

Coagulation by the use of alum has been used primarily by one operating company since the beginning of the synthetic rubber program. While such coagulation results in a higher ash, the water soluble portion is usually very low, and this in turn makes alum coagulated rubbers comparable to glue-acid coagulated rubbers from a standpoint of water soluble materials. Some quantities of GR-S-AC are used in electrical applications for this reason. However, by the use of dilute solution alum, a technique has been developed* by which the water soluble material is kept at an absolute minimum. The example, X-361-GR-S, is comparable to deproteinized natural rubber in this respect. Alum polymers are designated by the use of the suffix—AC, as GR-S-AC or GR-S-40AC.

6. Modification controls the Mooney viscosity of the polymer. Mooney might be considered to be roughly proportional to the molecular weight. Low modification results in high Mooney polymers such as GR-S-85 or GR-S-16 with resulting good physical properties and difficult processing. High modification produces a low Mooney GR-S which has good processing properties. The use of certain branched chain mercaptans facilitates the ordinarily difficult drying step involved with most low Mooney polymers. X-399-GR-S is an example of a low Mooney (25-35) polymer which can be compounded immediately without previous breakdown and has shown up very advantageously in initial evaluation for chemically blown sponge. Such polymers seemed destined for advantageous use in many other products. Polymers highly modified, i.e., low Mooney, with straight chain mercaptans (DDM) can be dried when masterbatched with carbon black or other pigments. GR-S Black-1 is an example.

7. Finishing operation in standard plants, or processing after coagulation, consists of filtering, washing, drying on a three pass dryer and baling. In one plant (Naugatuck) the coagulated latex is strained, dried in a one pass dryer, sheeted out on a rubber mill and then baled. The latter method, while more expensive to operate, results in a GR-S made with slightly less modifier which reportedly imparts slightly better physical properties. The work done during straining and milling results in partial breakdown and, thus, in improved processing. Such polymers are designated by a suffix—SP as GR-S-SP or GR-S-60-SP. A ¾ cent premium over the Standard GR-S price is charged on SP polymers. These GR-S types are used primarily by the wire and cable and footwear industries.

8. Cross-linking to produce a controlled gel is accomplished by adding a small quantity of divinylbenzene to the butadiene-styrene charge. An improved processing polymer with unusual properties results. Such polymers are described in a technical bulletin GR-S-60, to be described later in this paper. GR-S-60 (formerly X-285-GR-S) was the original type. However, similar polymers having supplemental properties have since been developed such as:

A—X-344-GR-S, a non-staining non-discoloring type.

B—X-393-SP-GR-S, a non-staining, non-discoloring polymer having low water absorption.

C—X-405-SP-GR-S, a non-staining, non-discoloring type with mixed rosin and fatty acid soap emulsification resulting in more tack and better physical properties, particularly in mineral pigment stocks.

As previously indicated X-405-SP-GR-S was a group development. This polymer was originally made as an experimental pilot plant polymer, XP-60, at the Government Laboratories in Akron. It was designed to have more tack for coating fabrics and still retains the excellent processing characteristics of similar cross-linked GR-S such as GR-S-60 or X-344-GR-S. This development was made in conjunction with the CPA Coated and Combined Fabrics Technical Consulting Committee. After evaluation, a number of companies requested additional quantities of XP-60. With these requests as a basis, Rubber Reserve interested other companies in XP-60 so that sufficient purchase permit requests were obtained to support a minimum production run as X-405-SP-GR-S. The continued production of X-405-SP-GR-S will depend upon the recent requests of those who have already evaluated it and the initial requests of those who have not yet evaluated this polymer.

It may be noted that pilot plant (XP) experimental GR-S polymers are not considered as regular production runs. Initial production runs in the large copolymer plants are made only on experimental (X-) numbers or special purpose polymers of the numbered GR-S classification.

Technical bulletins have been issued by Rubber Reserve describing the properties of several GR-S polymers. These bulletins are prepared and distributed in a cooperative arangement with the Rubber Manufacturers Association and the Rubber Reserve Agents originally participating in such developments. The technical bulletins issued as of September, 1947, include the following:

* *India Rubber World*, September, 1947, "Low Moisture Absorptive GR-S" by W. T. L. Ten Broeck and R. D. Juve.

1. "GR-S-65, A Special Purpose Synthetic Rubber with Superior Electrical Properties, Low Water Absorption, Low Soap Content, and Low Ash Content;" issued in January, 1947, with assistance from the United States Rubber Company.

2. "GR-S Latex, Type V, A Special Purpose Synthetic Latex with High Rubber Solids, Relatively Large Particle Size, Low Soap Content, Low Viscosity, and Rapid Drying Rate;" issued in June, 1947, with assistance from the Goodyear Tire and Rubber Company.

3. "GR-S-60, An Improved Processing GR-S, A Processing Aid for Standard or Special Purpose GR-S Polymers, Natural Rubber or Neoprene with the Special Property of Controlled 'Gel' by Cross-linking;" issued in June, 1947, with assistance from the United States Rubber Company.

4. "GR-S-10 and other Rosin Type GR-S Polymers, A Special Purpose Synthetic Rubber with Improved Tackiness for Laminating and Splicing, Quicker Breakdown and Easier Processing, Better Wear Resistance, Improved Resistance to Crack Growth and Tear, Greatly Improved Properties in Mineral Pigment Compounds, Better for Extrusions, Frictioning and Skin Coating;" issued September, 1947, with the assistance of the B. F. Goodrich Chemical Company and the United States Rubber Company.

5. "GR-S-25 and Similar Special Purpose Synthetic Rubbers; Non-discoloring, Non-staining, and Light in Color;" issued in November, 1947, with the assistance of the United States Rubber Company.

In addition to the above bulletins, a technical release entitled "Standard and Special Purpose GR-S Polymers"* as a series of charts numbered DST-1, 2, 3 and 4, dated February, 1947, has been prepared and distributed. These charts enumerate the properties of all of the numbered GR-S polymers and many of the experimental (X-) GR-S polymers. A revision of these charts was prepared and dated June 1, 1947, as DST-1a, 2a, 3a and 4a. An addendum to the latter was issued on November 17, 1947.

The above-noted addendum indicated the experimental (X) GR-S polymers which have been assigned to the numbered GR-S classification since June 1, 1947. These include: X-369-GR-S, now GR-S-Black-20 (contains 55 parts HMF black); X-382-GR-S, now GR-S-18 (GR-S-10 stabilized with Stalite); X-394-GR-S, now GR-S-20 (similar to GR-S-20AC, but with salt acid coagulation); X-250-GR-S, now GR-S-21 (stabilized and shortstopped with hydroquinone—contains no other antioxidant); and X-317-GR-S, now GR-S-45AC (40-50 Mooney GR-S stabilized with EFED). Copies of these bulletins may be obtained upon letter request to the Technical Service Section of the Office of Rubber Reserve. A limited number of these bulletins are available for distribution.

The original authorizations of experimental (X-) GR-S polymers are published monthly in the rubber trade journals. In many cases suggested uses are included with these authorizations. An interested consumer could obtain under normal circumstances a bale (75 pounds) or two of any of these experimental polymers for evaluation upon request to the Sales Division and at the Standard GR-S price. Some laboratories and companies have indicated an interest only in the large volume GR-S numbered polymers. However, it is only by wide and diversified interest and consumption that experimental (X-) GR-S polymers are assigned a higher category. Such a lack of initiative or interest in new developments, which must start from the experimental status, may result in a disservice to the industry by the loss of a valuable product. The properties of many of these new developments may be reflected in quality end-products or lower production costs to those consumers curious enough to thoroughly evaluate them.

* Rubber Age, April, 1947, page 81; *India Rubber World*, March, 1947, pages 808-10.

Outlook of the Rubber Industry for 1948

By HERBERT E. SMITH

President, U. S. Rubber Co., New York, N. Y.

THE demand for products of the rubber industry will continue at a high level in 1948, according to present indications. Total production of the industry for the coming year is expected to reach $2.5 billion or more than two and one-half times the volume of 1940, the prewar record year. This will compare with an all-time high of approximately $2.7 billion in 1947.

A total of 905,000 long tons of natural and synthetic rubber is expected to be used in 1948, against the all-time high consumption of 1,110,000 long tons forecast for 1947. Although production of most rubber products in 1948 will equal or exceed that of 1947, tire production will probably recede from the all-time high of just under 100 million casings in 1947 to a total of 83,000,000 casings in 1948.

Output of rubber footwear will be further increased in 1948 although production in 1947 was substantially greater than prewar. The re-introduction of style and color has been a strong influence in footwear and this is expected to continue. The active demand for rubber clothing and coated fabrics will continue.

Foam rubber, firmly established as cushioning in all transportation fields, will be increasingly available through 1948 for domestic furniture and mattresses. New plant capacity and the increased supplies of natural rubber will help this rapidly growing industry. With the return to natural rubber achieved, output of Lastex yarn in 1948 is expected to surpass prewar levels. Facilities have been increased to meet broad expansion in the use of this yarn.

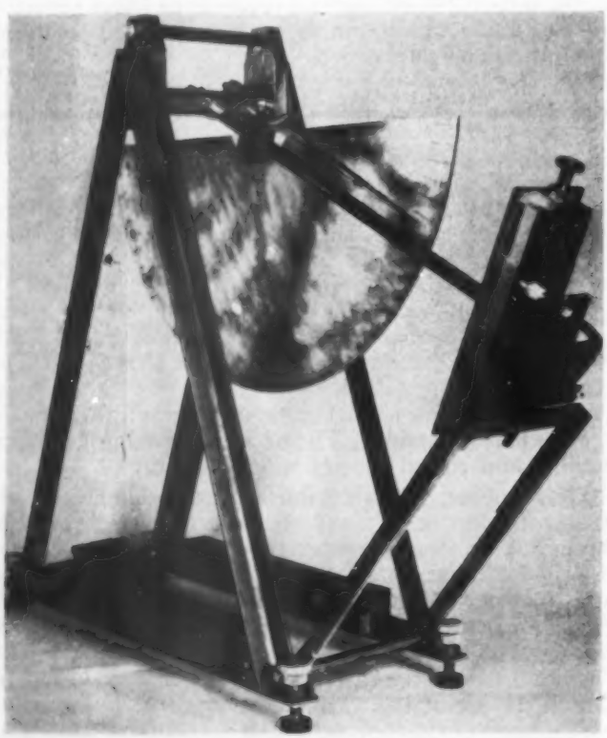
Industrial rubber products will be made in large volume. Most items will be in ample supply but conveyor belts will be short for several months. Production of golf balls, bathing caps and druggist sundries has been facilitated by the return of natural rubber and this merchandise will be in ample supply although the demand will continue at a high level.

Measurement of the Slipperiness of Walkway Surfaces

SLIPPERY walkway surfaces are responsible for a large number of serious injuries and accidental deaths every year. In order to eliminate as far as possible such hazards, a joint research project has been undertaken by the National Safety Council and the National Bureau of Standards directed toward developing safety codes for walkways and footwear. The Council is engaged in collecting data regarding accidents and in making a statistical study to show the circumstances under which accidents from falls occur.

The object of the Bureau's investigation is to develop methods for measuring the slipperiness of walkway surfaces under conditions of use and to apply these methods in selecting materials and methods of maintenance for both walkways and footwear that will reduce the frequency of accidents from falls.

Probably the most common way of improving the antislip characteristics of paving and flooring materials is to provide a roughened surface. This is accomplished in some flooring materials, such as metal stair treads and rubber matting, by forming corrugations or embossments in the surface; in others, such as rubber tile, ceramic tile, and troweled monolithic floors, by embedding rough abrasives like alundum or carborundum in the surface. However, due to difficulties of cleaning and maintenance, rough surfaces are shunned for general indoor use.



The portable impact-type slipperiness tester developed by the National Bureau of Standards is primarily a compound pendulum which sweeps a rubber or leather efficient" for the walkway and footwear surfaces is heel over the surface to be tested. The "anti-slip co- computed from readings of the pointer.

The establishment of safety codes for walkway surfaces and footwear has been materially handicapped by the lack of adequate methods of measuring slipperiness. Slipperiness is not a constant of the walkway or of the footwear but is a function of both surfaces and is materially affected by their condition. The correlation between coefficient of friction as commonly measured, and slipperiness as actually experienced is not good, especially where wet surfaces are involved. Most of the devices that have been used in the past for measurement of the coefficient of friction between shoe soles and walkway surfaces were concerned with starting rather than sliding friction, and an appreciable area of contact between sole and floor surface was generally used. These methods were thus more representative of a person standing on a floor than of someone in the process of walking, when most slips and falls occur.

As an aid in the design of testing instruments, the National Bureau of Standards is making a study of walking habits in an effort to obtain data on such factors as the manner in which the heel contacts a walkway surface during the restraining phase of a step, the probable angles of contact between heels and walkway surfaces, the momentary forces involved, and the functions of muscles in locomotion.

Concealed cameras have been used to take slow-motion pictures of people walking in their usual manner, while they were unaware of being photographed. These pictures show, among other things, that the foot is first placed upon the walkway surface at an angle so that only the rear edge of the heel is in contact during the early stages of the restraining phase of a step. The other foot remains in contact with the walkway and thus bears part of the vertical load until the heel rocks forward and the foot is firmly planted.

This phase of the investigation has been supplemented study of worn heels, which showed that maximum wear usually occurs at the outside border of the rear portion of a heel. The contour of this worn portion was found to be in the form of a curve rather than a bevel.

Design of Slipperiness Tester

It is extremely difficult to reproduce artificially, in the laboratory, walkway surfaces that are typical of the various conditions in service, because the location of a floor determines to a large extent the texture of its worn surface. Accordingly, P. A. Sigler of the National Bureau of Standards has designed a portable impact-type slipperiness tester that can be used to test floors in actual service. The design is based on the premises that slipping is a function of two surfaces and that in the process of ordinary walking slipping is most likely to occur when the walkway surface is first contacted by the rear edge of the heel.

The instrument is primarily a compound pendulum which sweeps a shoe material over the walkway surface to be tested. A mechanical shoe forms the lower end of the pendulum and is so arranged that a 1½-inch square test piece of rubber, leather, or other heel material can be attached to the underside of the shoe at various angles so that only the rear edge of the test piece makes contact with the walkway surface. A helical spring is used to press the edge of the test piece against the walkway surface during contact.

The pendulum is released at a fixed height and the edge of the heel is permitted to sweep over the surface of the floor specimen. A pointer attached to the framework at the center of oscillation of the pendulum indicates on a scale the maximum height to which the pendulum rises above its lowest position. From this information an "antislip coefficient" for the walkway and footwear surfaces can be computed.

Until the many factors which have a bearing on the results can be analyzed, it is advisable to consider the antislip coefficients obtained by this method as relative rather than absolute values. Some of the typical results obtained, however, may be of interest.

The antislip coefficients for concrete blocks ground with carborundum prior to testing ranged from 0.37 to 0.65, whereas the coefficients for a concrete floor with a cement-mortar topping, worn smooth over 25 years of service, ranged from 0.19 to 0.52. These results demonstrate the importance of surface condition and the inadvisability of assigning a single coefficient or even a single range of coefficients to one type of flooring.

The most important differences were observed in the wet state. Rubber tile with a very smooth molded surface showed high coefficients when dry but very low when wet. A rubber tile containing alundum grit was quite similar under dry conditions but was less slippery when wet. A rubber matting containing cotton fibers and in service in a transit bus showed fair antislip characteristics under all of the test conditions.

An investigation was made at Walter Reed General Hospital, Washington, D. C., to determine the relative slipperiness of different treatments for floors on which amputees are learning to walk with crutches and artificial legs. The antislip coefficients obtained for these floors were satisfactory under dry conditions, especially in conjunction with a rubber heel, but under wet conditions the floors would be classed as extremely hazardous, especially when waxed.

An extensive investigation was also made on the asphalt-tile corridors of the Pentagon Building. The relative order of the antislip coefficients obtained with the portable slipperiness tester correlates very well with their relative slipperiness as actually experienced, indicating that there exists a critical degree of slipperiness which largely determines whether or not a slippery condition exists. With the portable instrument, the critical antislip coefficient is about 0.4. Surfaces having coefficients of 0.45 or better were regarded as satisfactory.

Higher antislip coefficients were obtained for waxed asphalt tiles than for untreated tiles when tested with a rubber heel under dry conditions. With a leather heel the opposite was found true except for one type of wax. Under wet conditions all of the corridors would be classed as potentially hazardous for both rubber and leather footwear and especially so when waxed. In general, the antislip properties of the waxed asphalt tile corridors improved with continued exposure to dry maintenance and normal traffic.

In conclusion, it may be stated that good antislip properties under wet conditions are usually associated with asperities which project through the film of water and thus prevent its action as a lubricant. The asperities may represent either the roughened surfaces of the walkway or footwear materials themselves or particles of embedded sand or grit.

Health Protection for Small or Occasional Solvent Users

MOST occupational accidents involving solvents occur in the small plant or shop where there is no safety organization to supervise the handling of chemicals. Solvents are liquids commonly used for cleaning, thinning, degreasing, spot removing, etc. Although they are marketed under a variety of trade names, the most commonly used solvents consist of benzol, benzine, acetone, carbon tetrachloride, trichlorethylene or perchlorethylene. Careless handling of even small amounts of these materials may lead to fire or illness.

Since it is probably the proprietor, manager, or foreman in the small plant who must play the role of "safety director," it is up to him to read carefully the labels on all drums of chemicals received in the plant, and to be certain that the precautions recommended by the manufacturer are observed. If drums of solvents bear trade names which do not reveal their composition, this information can generally be obtained from the manufacturer or distributor.

Solvents are volatile liquids, that is, they give off vapors readily. With the exception of the chlorinated solvents (such as carbon tetrachloride) the vapors given off are flammable. Moreover, when air containing a large amount of solvent vapor is inhaled, illness is likely to result. If the concentration of solvent vapor in the air breathed is large enough, it is likely to cause unconsciousness and even death if the individual is allowed to remain in the atmosphere long enough. Lower concentrations of solvent vapor can give rise to headache, dizziness, stomach upset, and various disturbances of the liver, kidneys, or other organs of the body.

Of course, solvents can be, and are, used with complete safety, even in large volume, provided the proper handling methods are employed. This is usually the case in large plants, where continuous solvent processes are carried out with no difficulty. It is not so often recognized, however, that small uses of solvents, such as wiping of lenses, or occasional uses, such as cleaning motor parts, also constitute solvent "operations" which require attention.

For example, there was a recent case of occupational illness which occurred when a laborer was assigned to remove the grease from the gears of a mill prior to its dismantling. Since this was a "one time" job, the degreasing solvent was used in open buckets, with little attention to safety. In another instance, a man was employed to dip small metal parts in a 3-gallon vessel of solvent and then spread them out on an adjacent bench to dry. Only small amounts of solvent were involved, but this careless procedure led to a fairly severe case of solvent illness.

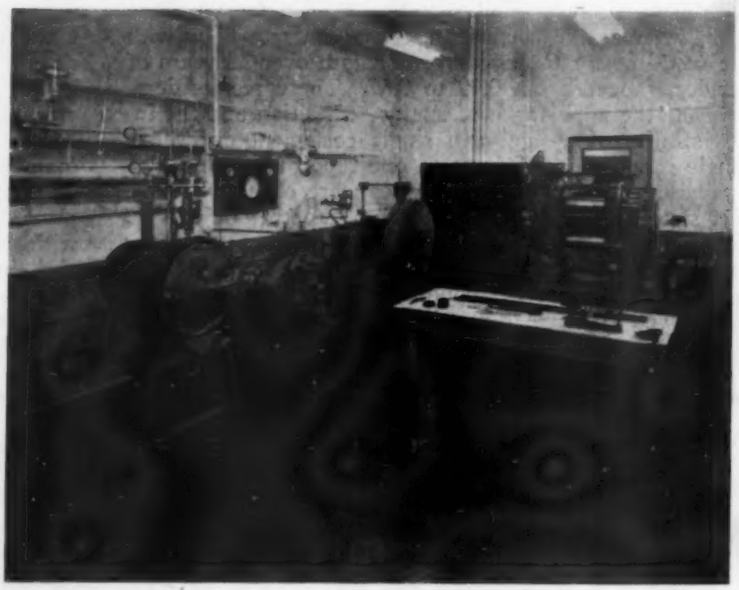
Safety Research Institute.

PHILBLACK'S

THE several views on this and the opposite page show the completeness of equipment for furnishing customer service in the new laboratory of the Philblack Division of the Phillips Petroleum Co. in Akron, Ohio. The laboratory was formerly operated by the Hycar Chemical Co. and was taken over by Philblack in April, 1946. Due to the fact that it was originally set up to handle but one type of product, considerable revision had to be made and a great deal of additional equipment installed.

The original laboratory consisted mainly of milling, curing, tensile testing, ovens, cold box and oil bath equipment. Since taking it over, Philblack has installed a Mooney Plastometer, Goodrich

The compounding and mixing room of the new Philblack laboratory is pictured above. The 6 by 18-inch mixing mill, compounding scale and work table are seen. A Model "B" Banbury has since been installed.



On the right is pictured the processing and curing room, with the following equipment seen left to right: a lift table for four-deck—20 x 28-inch platen press; an 18 x 24-inch open steam vulcanizer; a No. ½ Royle extruder; a 6 x 12-inch warm-up mill; a 6 x 12-inch calender.

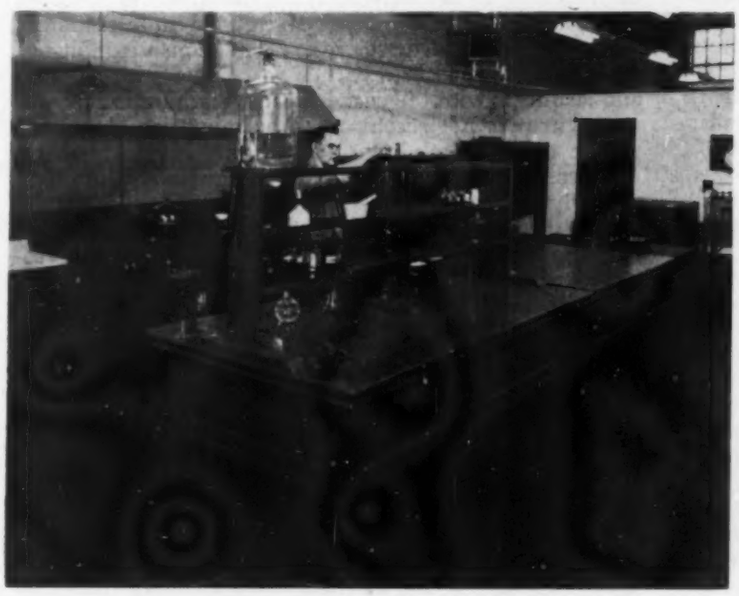
Another view of the processing and curing room is seen at the left. Although the platen press cannot be seen, the open steam vulcanizer, extruder, warm-up mill and calender are all on open view. The work table in the foreground is situated for the convenience of all those working in the room.

LABORATORY

Flexometer, DeMattia Flexer, Bureau of Standards Abrader, Angle Abrader, Ross Flexer, hot tensile tester, temperature and power recorders, a Banbury laboratory mixer, and numerous additional pieces of equipment.

The laboratory is now equipped and is being operated primarily to give service and assistance to the rubber industry on the use of the company's product. All long-range research on Philblack is carried on in the laboratory in Phillips, Texas. The Akron laboratory is manned by some 10 operators, including several highly-trained technical men, and is now in a position to take care of all types of sales service requests. Frank Andrews is general manager of the Division.

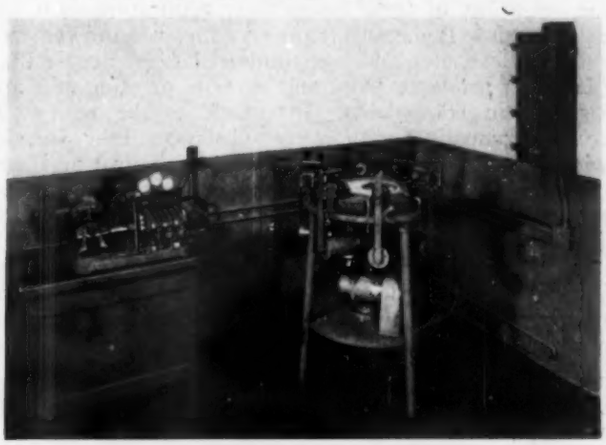
Physical testing equipment at the Philblack laboratory is pictured above including, from left to right, microscope, balance, Lupke rebound tester, Mooney plastometer, Goodrich flexometer and temperature recorder, DeMattia flexer. Additional equipment includes a dumbell flexer and grit washing apparatus.



The chemical analysis unit is seen at the left. From left to right is seen the sink, hooded chemical bench, drying and aging ovens, and a low temperature freeze cabinet. The unit is also equipped with all of the run-of-the-mill apparatus required for chemical analysis.

All tensile testing is done in the corner of the laboratory seen below. Equipment seen includes, from left to right, a Ross flexer, a hot tensile tester (up to 250° F.), and a room temperature tensile tester.

Abrasion testing equipment, which occupies one corner of the laboratory as seen below, includes a Bureau of Standards abrader (left) and an angle abrader (right). All electrical connections are concealed where possible.



Coumarone-Indene Resins in Rubber Compounding

By T. A. BULIFANT

Research Laboratory, Barrett Division, Allied Chemical & Dye Corp., Edgewater, N. J.

IN THE commercial production of coumarone-indene resins the raw materials most widely employed are those coal-tar naphthas distilling in the approximate range of 150°-200° C. which are rich in polymerizable constituents. Although these polymeric materials are usually referred to as coumarone-indene resins, they may also contain polymers of cyclopentadiene, styrene, methylcoumarones, methylindenes and dimethylindenes. Coumarone-indene resins pioneered industrially by the Barrett Company before World War I are marketed by Barrett under the registered trade mark "Cumar."

The properties of coumarone-indene resins depend on their derivation and the method of polymerization employed. They have been standardized as to melting point, color and ash content so that it is possible to obtain almost any desired grade to fit the requirements of industry. The melting ranges of the various grades lie between 5° and 160° C. and the ash content is 1% or less. The resins vary in consistency from viscous, syrupy liquids to hard brittle solids and in color from pale yellow to dark brown. The specific gravities range from 1.06 to 1.14. The resins are stable to about 250° C. but decomposition takes place at about 300° C.

The various grades of coumarone-indene resin differ in molecular weight; determinations on commercial medium to hard solid grades have revealed values ranging from 600 to 1000. Such resins melt to relatively low viscosity liquids and in true solvents show low viscosities at practical concentrations. The coumarone-indene resins are thermoplastic, neutral and non-saponifiable, resistant to acid, alkali, heat and water. They have a medium dielectric constant and a low power factor, and consequently these resins have found extensive use in insulation compounds. The resins are soluble in coal-tar solvents and aromatic type petroleum thinners, but are insoluble in alcohols.

Applications of the Resins

One of the earliest commercial uses for coumarone-indene resins was in rubber compounding. Because of the versatility of these resins their application soon was extended into the manufacture of adhesives and cements, rubber substitutes and compounded latices, mastic floor tile, paper products, paint and varnish, printing inks and vinyl resin compounds. Inasmuch as the resins are readily compatible with many substances, they are also widely used as modifying agents for natural and synthetic resins, waxes, bituminous materials, chlorinated products, vegetable oils, polymerized and blown oils and fatty acids.

In the early days of the manufacture of coumarone-indene resins by Barrett, the rubber technologist soon discovered that they were efficient softeners, extenders and tackifying agents. It was not long before they were used in practically all branches of the rubber industry. With the development of synthetic elastomers, coumarone-indene resins assumed even greater importance, particularly during World War II. The behavior, notably of the solid grades, was outstanding in the compounding of GR-S, especially with non-black or mineral fillers.

By the use of coumarone-indene resins it was possible to manufacture numerous war and domestic items which provided extraordinary performance that otherwise was not readily achieved. The light colored grades, because of their low tinctorial power, are used in the so-called white and light colored stocks, wherein they exhibit a very low degree of discoloration. They also exhibit but slight staining properties when in contact with enamels and lacquers; with the darker grades staining is accentuated, but it is not accompanied by migration.

The different grades of coumarone-indene resin do not necessarily function alike although they are all essentially compatible with the various elastomers. They represent quite a versatile group from which true softeners, extenders and reinforcing softeners may be selected for use in many rubber compounding problems, including applications in hard rubber items and in the reclaimed rubber industry.

The behavior of the resins depends largely on their melting point and on the composition of the polymeric mixture. The solid or hard grades usually perform as better extenders for the elastomers than the soft or plastic grades. The latter confer more tack and are usually selected for application in friction and laminated stocks. The soft or plastic grades also behave better in compounded latices and dispersions, due to their greater ease of emulsification. The resins have a solvent power for sulfur, and in rubber compounding this property assists in promoting a more uniform distribution of the sulfur throughout the elastomers, thereby improving the over-all performance of the vulcanizates.

Softening and Reinforcing Effects

Because of differences in crudes and polymerization methods, some of the resins are mainly coumarone-indene polymers. These grades behave as true softeners, markedly reducing the viscosities of the elastomers and subsequently improving processibility and providing soft vulcanizates. On the other hand, some of the resins are mainly styrene polymers that promote reinforcing effects. They do not reduce viscosities as much, but have a greater effect on modifying the nerve of the elastomers, and thus are better suited for extruded items. Further, they confer stiffness and hardness to the vulcanizates, accompanied by higher moduli and shorter elongations. Tensile strengths are substantially the same as with the use of grades relatively high in coumarone-indene polymers.

Both types usually function alike with respect to tear and abrasion resistance, although the grades in

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NOTE: This paper was presented at the "Symposium on Synthetic Resins Used in Compounding Natural and Synthetic Rubbers" held by the New York Rubber Group in New York City on October 24, 1947.

which the coumarone-indene polymers predominate are better suited for dynamic performance than those in which the styrene polymers are dominant. They provide vulcanizates with better hysteretic properties, lower compression set and permanent set, and with less dimensional change than do the high styrene content grades. The resins high in coumarone-indene polymers are also better adapted where tack is essential, providing a stronger bond in laminated items, and they are the preferred type for cements, coatings and adhesives.

The order of adding coumarone-indene resin to a rubber mix may vary according to factory conditions and procedures. In milled batches it is preferable to add the resin to the rubber at the start of the milling to facilitate breakdown and shorten the mixing time. In Banbury mixing they can be added with the other ingredients in the conventional manner. The plastic grades disperse readily at batch temperatures generally below 140° F., whereas the hard or solid grades require batch temperatures of 150° F. or higher.

The coumarone-indene resin concentration may vary up to 10 parts per 100 of rubber hydrocarbon in low and moderately filled stocks. In highly loaded stocks, larger proportions, particularly of the hard grades, are often used because of their greater extending behavior. This permits the design of low cost compounds with retention of adequate physical properties for many specialized applications.

Properties in Rubber Stocks

When used with natural rubber or the butadiene elastomers, coumarone-indene resins exert a mild retarding effect upon the rate of cure which necessitates adjustments in the curative proportioning. With natural rubber, an increase of 0.1 part of sulfur for every 5 parts of coumarone-indene resin suffices to counteract the retarding effect. Although in some cases, depending upon the type of accelerator and other ingredients used, it may be necessary also to increase the accelerator concentration. Similar conditions apply to the butadiene elastomers, and it is always essential to have the proportions of sulfur and accelerator well balanced, if optimum physical properties are to be obtained.

However, in spite of increases in curative proportioning, the coumarone-indene resins frequently cause sufficient retardation of cure in the initial stages to minimize scorching during processing, and setting-up of milled batches before curing. In addition, the resins promote a flat curing curve, and yield compounds possessing good aging properties, regardless of the type of elastomer in which they may be used. The tear resistance of the vulcanizates is retained, particularly at elevated temperatures, which is often significant in the removal of vulcanizates with complicated shapes from hot molds.

The coumarone-indene resins, therefore, offer the compounder a wide selection of softeners for modifying and improving the properties of rubber stocks. They are effective in reducing the viscosities of the elastomers, with subsequent improvement in processibility and dispersion of the fillers. Thus, a proper grade may be selected wherever improvement in frictioning, calendering and extruding properties are essential, where tack is desired or where scorching may be a problem. The softening action of the resins allows the addition of high filler loading to the elastomer, providing batches which can be suitably factory processed.

The proper selection of coumarone-indene resin permits the design of compounds within a wide Durometer range, that is, from approximately 40 to 90. The extending properties of the resins contribute to the retention of tensile strength and to tear, and to improvement in crack-growth resistance.

The pronounced softening and extending properties of the coumarone-indene resins in the butadiene-styrene copolymers are rather well known. With mineral fillers, the hard or solid resins promote high tensiles and elongations, and high tear and crack-growth resistance, whereas the physical properties of the mineral-filled elastomer without the resins are inferior. In blends of crude rubber with the butadiene-styrene copolymers, the resins continue to exhibit pronounced extending properties. In carbon black-filled stocks with the same synthetic elastomer type, the use of the resins improves the general behavior and over-all performance of the compounds, but their extending properties are not as pronounced as with the mineral fillers.

The discovery of the significant effects of coumarone-indene resins in mineral-filled butadiene-styrene copolymers during the early stages of World War II resulted in their extensive use in insulated wire stocks, footwear, drug sundries and many other items. The compounder was thereby greatly assisted in solving many of his problems.

Use with Special Synthetics

The coumarone-indene resins have specific applications in the compounding of butadiene-acrylonitrile copolymers. They are incorporated rapidly, confer a fair degree of tack and promote improvement in frictioned, calendered and extruded stocks. They contribute to high tensiles and elongations, low moduli, good tear and abrasion resistance, and provide medium and high Durometer stocks. The resins also improve resistance to sunlight and heat. Because of their resistance to paraffinic type oils and solvents, these resins are particularly valuable in nitrile rubber compounds designed for gasoline hose, automotive and aviation parts, and other items in contact with petroleum oils and fuels.

In neoprene, the coumarone-indene resins assist in wetting the fillers and in hastening their incorporation. They plasticize the elastomer so that larger proportions of filler may be used before the batch becomes too stiff to process satisfactorily. The resins behave as extenders, contributing to the retention of tensile strength, lowering of the modulus and hardness, increasing the elongation, and slightly improving resilience, so that in many applications their use is not only based on economy, but also on quality maintenance. The resins are especially adapted for use in neoprene friction and oil resistant compounds. The swelling in oil of vulcanizates containing the coumarone-indene resins is comparatively low and the tensile strength of the vulcanizates is not appreciably affected after oil immersion.

In Thiokol compounds, the use of coumarone-indene resins promotes tack, which enhances their value for frictioning purposes. They are also used for improving adhesion, such as the adhesion of Thiokol to itself, to rubber stocks, to fabric and to metals.

In Butyl rubber, the use of 5 parts per 100 parts of elastomer of coumarone-indene resin, especially the plastic grades, promotes tack, does not interfere with the cure nor affect aging properties. The resins reduce the viscosity of the elastomer, and in the vulcanized stock they decrease modulus and increase elongation without causing any material change in hardness or tensile strength. Further, the resins do not adversely affect tear resistance, permanent set, compression set, and resilience.

In the manufacture of reclaimed rubber, especially

the colored varieties, the resins may be used to improve tack or to modify other properties for special applications. Coal-tar fractions containing the polymerizables are widely used in the digester process. Under heat and pressure the resins are polymerized and, in conjunction with the naphtha fraction, assist in producing quality reclaimed rubbers.

Summary

The desirable properties conferred by coumarone-indene resins to natural rubber and the synthetic elastomers assist the compounder in the formulation of goods that provide satisfactory and economical performance under service conditions. For application in tires and mechanical parts, in automotive and aviation items, in footwear, soles and heels, in wire and cable insulations, in proofing and sheeting, in cements and adhesives, in dispersions and emulsions, in sponge and hard rubber, and in the manufacture of rubber substitutes and reclaimed rubbers, coumarone-indene resins represent a serviceable group of softeners.

Firestone Plants Utilize Power Brushing for Cleaning Molds

POWER brushing is being utilized in many ways in the tire industry, but one of its most important contributions is made in connection with tire mold-cleaning operations at the plants of the Firestone Tire & Rubber Company, according to a survey recently completed by the Osborn Manufacturing Company, of Cleveland, Ohio.

Firestone is said to have been the first tire manufacturer to recognize the value of wire brushing wheels in connection with its tire mold cleaning. For example, the task of cleaning watch-case tire molds by any other method would necessitate removal of the molds from the press, and would be very costly. Furthermore, additional molds to replace them while they were out of production during the cleaning process would be necessary if maximum production was to be maintained.

Process Relatively Inexpensive

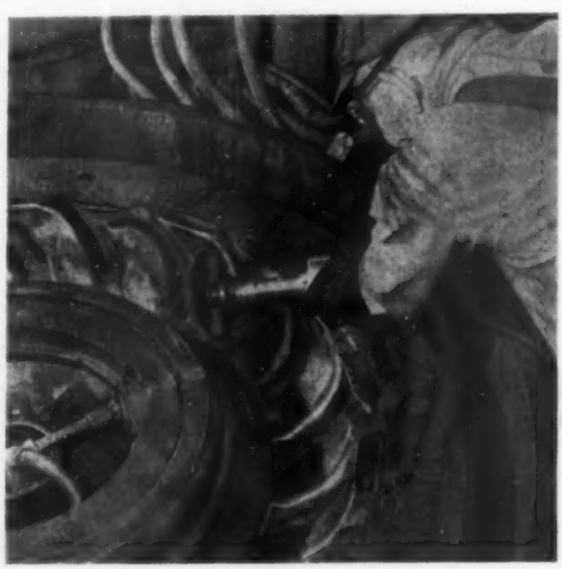
At Firestone the cleaning of the larger agricultural equipment and tractor tire molds is accomplished within a few minutes by a simple and comparatively inexpensive process. In the company's curing room, a mold is ready for cleaning as soon as the cured tire is removed and it is sufficiently cool to permit safe working conditions. The larger molds are first "burned" with an oxygen torch, when necessary, to soften up the hard particles of rubber that cling to the deep and sharp crevices through which the tread design is accomplished.

The molds for the smaller standard size tire are merely brushed once during each shift. A 7-inch Osborn wire brushing wheel, composed of three sections to the set, is mounted on a 3000 r.p.m. portable air tool to thoroughly clean and prepare the mold for the next curing operation. The time of the operation varies, of course, according to the size and type of mold being cleaned, but in no instance does it take more than a few minutes. All of Firestone's molds are cleaned by the brushing process, including those used for curing passenger car, truck, airplane, tractor and other agricultural equipment tires.

In addition to accomplishing the cleaning operation in the least possible time and in the most efficient manner, Firestone officials declare, the power-brushing technique also permits longer mold life by conditioning the surface of the metal. The tires produced by this method have a smoother and glossier surface than when other methods of mold cleaning are employed. Power brushing is also used extensively in the cleaning of fabric liners which are used to separate the layers of rubber as it is processed.

Provention of Fire Hazards

Power brushing also plays an important part in Firestone's extensive program of prolonging the life of vital and scarce equipment and of preventing fire hazards. For example, in the separate building used for storing latex, an 8-inch bronze sparkproof Osborn wire steel brush is used for cleaning the empty drums. These steel drums, which are first put through a Portco steam-pressure cleaner, are then flushed and brushed with the sparkproof brush and a solvent. Power brushing is the only satisfactory method Firestone has found to clean these drums and, at the same time, prolong the life of the drums by keeping them free of scale and rust.



This is a close-up of the tractor tire mold cleaning operation in one of the Firestone plants, showing the method by which a 7-inch Osborn brushing wheel, mounted on a hand fixture, is used to clean and condition the metal mold.

Division of High Polymer Physics, A. P. S., Meets in Chicago, Ill., on December 29-31

THE 1947 Regular Meeting of the Division of High Polymer Physics of the American Physical Society will be held in Chicago, Ill., on December 29 to 31, during the joint meeting of the parent society and the American Association for the Advancement of Science. The meeting of the Division will feature the presentation of 18 technical papers. J. W. Liska, of the Firestone Tire & Rubber Co., Akron, Ohio, is Chairman of the Division's Program Committee. Abstracts of the papers to be presented, together with their authors and connections, follow herewith:

Depolarization of Light Scattered by Macromolecular Solutions. ***Paul Doty and S. J. Stein (The Royal Institution, London, and the Polytechnic Institute of Brooklyn). (Note: Dr. Doty's present address is University of Notre Dame, Notre Dame, Ind.).***

The light scattered transversely from a solution through which a parallel beam of monochromatic, polarized light passes can be readily resolved into vertically and horizontally polarized components. When the incident light is vertically polarized these components in the scattered light are designated as V_v and H_v; when it is horizontally polarized the components are denoted by V_h and H_h respectively.

A qualitative theory is presented which predicts the variation of these four components with such variables as molecular weight, concentration, molecular size, solvent-solute interaction and ionic charge. These details are discussed separately for flexible and rigid molecules. The results for the different components can be combined to predict the behavior of the conventionally measured depolarization ratios: $_{av}$ ($=H_v/V_v$) and $_{ah}$ ($=V_h/H_h$). It is clear that less ambiguous interpretations of data are possible if the absolute values of the individual components are measured rather than the ratios as heretofore.

The calculation of macromolecular dimensions by measuring depolarization ratios is discussed and several important errors in the literature are corrected. Some measurements on polymer solutions and tobacco mosaic virus solutions under different conditions are presented and interpreted in terms of the theory. In particular, a correlation of orientation in the contacts of polymer segments is noted and a precise test of the calculation of dimensions of rod-like molecules from depolarization measurements indicates the essentially qualitative nature of this relation.

Adsorption Analysis of High-Molecular Substances. ***Ingrid Claesson and Stig Claesson (University of California, Berkeley, California).***

Some preliminary experiments have been carried out in order to investigate the possibilities of using adsorption analysis in the study of high polymeric substances. The experimental arrangements for adsorption analysis developed by Tiselius and one of the present authors will be described. So far the so called *frontal analysis* has been used. This means that the solution is forced through a column with adsorbent and the concentration of the effluent is followed continuously with a micro-interference-refractometer. Activated charcoal has been used as adsorbent.

It has been possible to show the occurrence of different discrete fractions in nitrocelluloses, polyvinylacetates and synthetic rubbers. The fractions do not differ in molecular weight only as they do not show up as separate boundaries when the original rather polydisperse solution is ultracentrifugated. The fractions from the adsorption analysis are less polydisperse than the original solution.

From a separate study it has been found that the amount adsorbed decreases with increasing molecular weight of the high polymeric substances and the same is true for the rate of adsorption (diffusion effect) which is rather slow. Both these effects will cause the higher molecular species to occur in the first fractions, making it possible to fractionate high polymeric substances according to molecular weight. The separation factor is however not large enough to account for the occurrence of the discrete fractions mentioned earlier.

Thus it appears that adsorption analysis makes it possible to fractionate high-polymeric substances both according to molecular weight and to other variables.

Elasto-Viscous Properties of Polyisobutylene. I. Relaxation of Stress in Whole Polymer of Different Molecular Weights at Elevated Temperatures. ***R. D. Andrews and A. V. Tobolsky (Princeton University) and N. Hofman-Bang (Technical University of Denmark, Copenhagen, Denmark).***

Stress-relaxation in polyisobutylene whole polymers of different average molecular weights has been investigated over the temperature range 30° to 100°C. at different elongations. The relaxation curve for a given molecular weight, when plotted as "reduced stress" vs. logarithmic time, has the same shape at different temperatures, differing only in position along the time scale. Activation energies for relaxation, calculated by use of the Arrhenius equation for the different molecular weights, are found to be experimentally identical, having the average value 15.4 kcals. The shape of the curve is independent of elongation up to approximately 70% elongation; beyond this value the curve shows the relative decrease in stress between any two arbitrary time values to increase with increasing elongation. The relaxation curve does not correspond to exponential, hyperbolic-tangent, or exponential integral functions; the experimental points are fit best by a hyperbola.

Reciprocal-viscosity average-molecular weight plotted against the logarithm of the time at which the reduced stress has a certain arbitrary value, at a fixed temperature, yields straight lines. Relaxation rate depends on molecular weight with sufficient sensitivity so that stress-relaxation may be a practical method of measuring the molecular weights of raw polymers directly in the solid state.

The Viscosity of Glass. ***Howard A. Robinson and Edward M. Man, Jr. (Armstrong Cork Co., Lancaster, Penna).***

A careful study has been made of empirical formulae which have been proposed connecting the viscosity of glasses with temperature. It is shown that the Waterton and the Fulcher equations for the viscosity-temperature effects are essentially identical and that both can be made to fit experimental results well within the experimental error from $\log \eta = 16$ down to $\log \eta = 1.5$. Beyond these extremes the formulae diverge. It will be shown that A, B and T_o, the constants of the Fulcher equation, are linear functions of glass composition. Factors will be presented for the two component Na_2O - SiO_2 glasses. Successful applications of these ideas have been made to glasses containing as many as eight components. It is, therefore, possible to calculate the viscosity of glasses of quite wide compositional ranges by means of these empirical factors with an average accuracy of less than five degrees Centigrade for each viscosity point calculated.

Use of the Electron Microscope in Exploring the Smoothness of Surfaces. ***Robley C. Williams (University of Michigan, Ann Arbor, Michigan).***

The application of the electron microscope in the study of surface detail has been greatly extended in recent months by the improvement of techniques which allow extremely small irregularities to be photographed. It is now possible to discern sharp surface discontinuities of magnitude less than 5 angstrom units. The methods have been used to explore the detail in the surfaces of polymers such as collodion, polyvinyl formal (Formvar), and Polythene, and in the surfaces of non-organic materials such as crystals, thin evaporated films, and glass.

A Theory of Commercial Yarn Testing. *Charles J. Geyer, Jr., (American Viscose Corp., Front Royal, Va.,) and C. H. Reichardt and George Halsey (The Textile Foundation, Princeton, New Jersey).*

A method has been devised for the application of the theory of the three-element shear model of Eyring and co-workers to textiles which does not necessitate the location of the "basic spring line" and thus is readily applicable to both yarn and fiber tests and to the commercial inclined-plane and pendulum-type testers. It is also applicable as a first approximation to those textiles which do not possess a "basic spring line" as such. The method employs the conventional spring constants or elastic moduli but determination of the viscous constant involves the magnitude of the relaxation in constant rate of elongation experiments (or the magnitude of the creep in constant rate of loading experiments) from the upper envelope per interval of time.

The relationship has been employed to establish the correlation between the visco-elastic properties of "slashed" and "unslashed" viscose tire cord rayon yarns and also to show the identity of single filament stress-strain relationships with those of yarns of normal twist of the same textile. The simplicity of technique which enables this method to be used as a routine laboratory test for the determination of the visco-elastic properties of textiles affords it a distinct advantage over previous methods, which were often unsatisfactory from both a theoretical and an experimental viewpoint.

Creep, Recovery and Permanent Set for GR-S and Hevea. *S. D. Gehman (Goodyear Tire & Rubber Co., Akron, Ohio).*

In all of the tests with Hevea and GR-S, a considerable part of the creep was due to permanent set. The proportion increases with the elongation and duration of the test. At low elongations, GR-S shows much more creep than Hevea but a smaller portion of it is due to permanent set.

At the start of the creep test, the flow appears to be due largely to the reversible yielding of relatively weak bonds which can reform under the action of the elastic network when the load is removed. For longer periods of time or for higher elongations, the flow involves more deep seated changes in structure. Larger units of structure are displaced or stronger bonds broken with resultant permanent molecular displacements upon removal of the load.

For Hevea at high elongations it is probable that flow occurs in the amorphous material between the crystallites with whole crystallites being displaced with reference to each other. Under such circumstances, the original relative molecular configurations cannot be reassumed upon removal of the load.

Correction of the creep curves for permanent set gives nearly straight lines on a plot against logarithmic time.

The Thermodynamics of a Strained Elastomer. I. General Analysis. *M. Mooney (U. S. Rubber Co., Passaic, N. J.).*

The thermodynamic functions of principal interest in a strained elastomer are the entropy and energy of deformation. The volume is of secondary importance, and it can be assumed, with sufficient accuracy for most purposes, that the volume is linear in the temperature and the mean pressure. The basic partial differential equations of thermodynamics can then be integrated, yielding expressions for the energy and entropy of deformation in terms of observable quantities.

In the present analysis the volume effects due to changes in mean pressure and crystallinity are taken into account; and the effects associated with change in shape are sharply separated from those associated with change in volume. It is shown that the superelastic functions of deformation previously published [Mooney, *J.A.P.*, Vol. 11, pp. 582-92 (1940)] have a very general validity.

The Thermodynamics of a Strained Elastomer. III. The Thermal Coefficient of Modulus and the Statistical Theory of Elasticity. *L. E. Copeland and M. Mooney (U. S. Rubber Co., Passaic, N. J.).*

Published thermoelasticity data are critically analyzed by means of thermodynamic equations developed in the first paper of this series. Equations known to be of the proper form are fitted by least squares to the experimental data, which were first corrected to allow for the changes in shape when tested under variable temperature and constant volume. If the measurements are accepted as truly reversible, the data show that several different elastomers depart considerably in some respects from the predictions of the statistical theory of elasticity.

Some thermoelasticity measurements in torsion are reported which seem to give the most reliable evidence that stress is proportional to absolute temperature.

The Effects of Pile Bombardment on Uncured Elastomers. *W. L. Davidson (Clinton National Laboratory, Oak Ridge, Tenn., and B. F. Goodrich Co., Akron, Ohio) and I. G. Geib (B. F. Goodrich Co., Akron, Ohio).*

Previous work on the effects of ionizing radiations on hydrocarbons has established that four competitive processes are usually operative: (1) Dehydrogenation; (2) Condensation or polymerization; (3) Hydrogenation (action of nascent hydrogen on any unsaturated matter present); and (4) Decomposition (C-C cleavage).

The chain reacting nuclear pile offers an ideal means for subjecting relatively thick samples of matter (such as rubber) to uniformly high concentrations of radiation. Such studies on natural rubber, butyl rubber and polyisobutylene allow one to draw the following conclusions:

1. Uncured natural rubber undergoes a slight curing action when exposed to pile radiations.

2. Polyisobutylene samples are appreciably degraded by pile radiations.

3. The same effects as noted in (1) and (2) are greatly enhanced by secondary alpha particles, produced by an (η, α) reaction on boron[10] (milled into the elastomer). However even a 2 hour bombardment of natural rubber yields a product greatly inferior to sulfur vulcanizates.

4. Pile bombardment does not introduce measurable unsaturation in polyisobutylene and decreases the unsaturation in natural rubber but slightly.

5. A typical butyl rubber stock is permanently degraded by pile irradiation showing upon cure reduced tensile strength compared to that of a control sample.

6. Natural rubber shows a weak but measurable radioactivity days after bombardment, probably due to its mineral content. Polyisobutylene is not appreciably active.

(Note: Part of the experimental work for this report was performed under Contract No. W-35-058, Eng. 71, for the Atomic Energy Commission while Dr. Davidson was a member of the Clinton Laboratories Training School on leave of absence from the B. F. Goodrich Co.).

The Hydrolysis of Proteins. *H. B. Bull. (Northwestern University, Chicago, Illinois).*

No abstract provided.

Proteins as Polycondensations of Amino Acids. *Dorothy Wrinch (Smith College, Northampton, Mass.).*

The native proteins are polycondensations of α-amino acids, NH_2-CHR-COOH, in *levo* form, about 21 different species and 2 cyclic amino acids being recorded to date. The proteins are of unknown structure and the question then arises as to light, if any, which polycondensations of known structure can throw upon this problem.

The similarities and dissimilarities of proteins in particular and high molecular weight substances in general are discussed. The latter, several of which belong to the domain of crystal physics, are far more striking. They include the perfection of regularity of atomic arrangement attained by protein crystals and the high prevalence of twinning.

The implications of the facts include the following: (1) While high molecular weight substances in general are "open" structures, whether they be chains (with or without branches or cross bonds) or 2- or 3-dimensional networks, the molecules of protein are "closed." (2) Some or all of the monomers in proteins have functionality higher than 2. Possibilities regarding this higher functionality are investigated. The further implications for the structure of proteins of the facts assembled are discussed, particularly in existence of protein twins, which leads to a new theory of twinning.

Studies of the Melting Points, Rigidities, and Optical Activities of Gelatin Gels. *John D. Ferry and John E. Eldridge (University of Wisconsin, Madison, Wisc.)*

Four ossein gelatin samples, previously degraded to varying extents to give number-average molecular weights ranging from

17,000 to 45,000, have been studied in solution in 0.15 M. NaCl at pH 7. Gels were formed by chilling solutions at 0° for 24 hours and then subjected to the following measurements: (1) melting point as a function of gelatin concentration and degree of degradation, (2) rigidity as a function of temperature and degree of degradation, (3) optical activity as a function of temperature and degree of degradation.

The melting point data gave a series of straight lines, one for each sample, when the logarithm of the concentration was plotted against the reciprocal of the absolute temperature of melting; the slopes were identical. With increasing temperature, the gel rigidity approached zero while the optical activity decreased to a constant value which was independent of molecular weight. In every case, the rigidity disappeared at a lower temperature than that at which the optical activity attained its minimum value. At a given temperature below the melting point, both rigidity and optical activity increased with increasing molecular weight.

The gelation process is regarded as the formation of a three-dimensional network due to the gradual cross-linking of gelatin molecules at rather widely separated points. The optical activity curves indicate that some of these cross-links exist above the melting point but disappear above 40°C.

Viscosity and Streaming Birefringence of Nucleic Acid. ***Jesse P. Greenstein (National Institute of Health, Bethesda, Maryland).***

Aqueous solutions of the tetrasodium salt of thymus nucleic acid show anomalous viscosity and intense birefringence of flow. The compound behaves monodisperse in the ultracentrifuge and an S=11 has been calculated for a highly polymerized sample tested. When such solutions are irradiated by ultraviolet light (2537Å) or by X-rays, these properties are considerably diminished, at a rate which is roughly proportional to the amount of radiation administered. On cessation of ultraviolet irradiation the reduced value for the viscosity remains constant. On cessation of X-irradiation, the reduced value for the viscosity diminishes further with time of standing.

There are thus two consecutive phenomena as a result of X-irradiation, that which occurs during irradiation and which has no apparent temperature coefficient, and that which occurs after irradiation has ceased, and which is dependent upon the temperature. The average S for the particles of nucleic acid after X-irradiation is about 5. Such particles do not pass through cellophane. No ammonia or phosphate is released. A similar reduction in viscosity and birefringence occurs in nucleic acid solutions treated with various salts, and with proteins.

The Study of Macromolecular Reactions of Biological Interest. ***Paul Doty (University of Notre Dame, Notre Dame, Indiana).***

Recent progress in the light-scattering method of determining weights and shapes of macromolecules is reviewed. In particular, the measurement of the complete angular dependence and the utility of transmission measurements is described. With regard to the transmission method it is demonstrated that the wave length dependence is equivalent to the previously used dissymmetry measurements.

These techniques are admirably suited to study the kinetics and thermodynamics of macromolecular reactions when a change in molecular weight or shape is involved. By the analysis of scattering data obtained as a function of time the reaction between purified antigen and antibody is being studied. The polymerization of globular proteins into linear aggregates and the dissociation of protein into sub-units is also easily followed by these techniques.

Tropomyosin, a newly discovered muscle protein, displays abnormal habits of crystallization and fibrillar aggregation; a beginning has been made on the study of these reactions. Since this protein is probably a single or at most a double polypeptide chain it forms a useful link between proteins and synthetic polymers. Preliminary measurements on the unfolding of proteins in denaturation reactions have been performed. In this application the unfolding and subsequent aggregation of the protein molecules are readily resolved.

When observations at different times are made as a function of temperature the energy of activation can be evaluated. The temperature dependence of the equilibrium permits an evaluation of the heat of the reaction. These procedures are possible because of the immediate response given by the light scattering method. Even in equilibrium studies where time is available for the application of other measurements the temperature range available for investigation is broadened because of the short time required for observation.

Dynamic Mechanical Properties of Rubber-Like Materials. ***A. W. Nolle (Massachusetts Institute of Technology, Cambridge, Mass.).***

The differential dynamic Young's modulus for representative rubber-like materials has been measured over a frequency-temperature range which at its widest limits extends from 10^{-1} to 10^{8} cycles per second and from —50 to 100°C. This dynamic modulus, measured for the case of small sinusoidal strain variations, is a complex number so that for each experiment both a real modulus and a loss angle tangent are reported. Described are five methods of measurement which have been used to obtain natural frequency, resonant frequency, bandwidth, decrement, etc. Methods include mechanical and magnetostrictive excitation. In addition the bulk wave modulus and its loss-angle tangent, at 10^{7} cps, are measured by an ultrasonic-pulse method.

The results show the existence of dispersion over at least six decades of frequency. The loss factor and complex compliance as functions of frequency and temperature are analyzed and discussed.

The dynamic-modulus results, in the limiting case of very low frequency, below the range of appreciable relaxation effects, are shown to be in agreement with the kinetic theory of rubber-like elasticity. Compounds of Buna-N, butyl, GR-S, neoprene and natural rubbers are considered and characteristic differences are described. This work was supported in part under Contract NObs-25391, Task No. 1, with the Bureau of Ships.

Method for the Absolute Measurement of Dynamic Properties of Linear Structures at Sonic Frequencies. ***W. James Lyons and Irven B. Prettyman (Firestone Tire & Rubber Co., Akron 17, Ohio).***

A full account, including the theoretical basis, is given of a method whereby the dynamic stretch-modulus, coefficient of internal friction and hysteretic energy-loss of textile yarns and cords, composed of either continuous filaments or staple fibers, can be accurately determined at longitudinal-vibration frequencies above 100 cycles/sec. The method, which employs electromagnetic excitation, is applicable also to glass cords, and metallic wires and cables. Results have been obtained at frequencies extending to above 300 cycles/sec. A concise description is given of the improved stretch-vibrometer. Results on a typical cotton cord show that energy absorption by this instrument is negligible, permitting the calculation of an accurate internal-friction coefficient, and absolute hysteretic loss.

Measurements on eight, natural and synthetic, textile fibers reveal that the dynamic moduli range from 6.4×10^{10} dynes/cm^2 for Velon monofil to 54×10^{10} dynes/cm^2 for a ramie cord. The dynamic moduli of Fiberglas and steel cords were found to be $54 \times 106 \times 10^{10}$ dynes/cm^2, respectively. The internal-friction coefficients are found to vary hyperbolically with frequency: in a 11/4/2 cotton cord, for example, from 1.5 to 8.0×10^{8} poises between frequencies of 60 and 320 cycles/sec.

Transducer Measurements of the Mechanical Properties of Polymer Solutions. ***Thor L. Smith, John D. Ferry and Frederic W. Schremp (University of Wisconsin, Madison, Wisc.).***

Apparatus has been designed for studying the mechanical properties of concentrated polymer solutions in small oscillating deformations, at audio frequencies. A rod, driven by a coil in a magnetic field, oscillates vertically along its axis in a cylindrical tube of solution. The gap between rod and tube is 1 mm. and the amplitude of vibration about 0.002 mm., so the maximum shear is very small and the maximum rate of shear moderately small even at 1,000 cycles. By measuring the electrical resistance and reactance of the coil when in motion and when rigidly clamped, or when in motion with different masses attached to vary the inertia, the mechanical resistance and reactance of the system can be obtained from well-known transducer relationships. The former yields the real part of the dynamic viscosity of the solution, η'; the latter, under favorable conditions, yields the real part of the dynamic rigidity, G'. For polymer solutions, the viscosity η' is found always to be very much smaller than the ordinary viscosity measured in steady flow. Examples of experimental data will be given.

Editorials . . . . . .

Season's Greetings

EVERY year on the occasion of the Holiday Season it has been our pleasure to send our best wishes to our many friends in the rubber and allied industries. And over the years, we have found no better words than the time-honored, never time-worn greeting, simple and sincere—Merry Christmas and the very best of wishes for a Healthy, Prosperous New Year.

THE PUBLISHERS

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Public Hearings

TESTIMONY offered during the public hearings at Washington, D.C., during the first two weeks of the current month, under the auspices of the Shafer Subcommittee of the House Armed Services Committee, to determine public and industrial feeling with regard to national rubber policy, revealed that rubber manufacturers are divided in their opinion as to such policy. As reported elsewhere in this issue, there is one group which is strongly in favor of maintaining the present regulation on a status quo basis for at least another year, while the second group equally as strongly is urging immediate revision of the regulation and disposal of the synthetic rubber plants to private industry.

Only on one point were those presenting testimony in agreement, namely, that there can be no compromise with respect to the basic fact that in view of world conditions security reasons must be given top priority in any decision on national rubber policy. As this column has attempted to hammer home time and again, never again must the lack of an adequate rubber reserve jeopardize the military security of the United States. It is quite fitting that the sixth anniversary of Pearl Harbor occurred while the hearings were taking place.

There are several factors favoring the extension of the present Public Law No. 24 for another year from March 31, 1948. Although some of our more optimistic executives maintain that synthetic rubber at its present stage of development is ready to run a race with the natural product, the realists admit that natural rubber has a very definite and decided edge in both physical and chemical properties and only unreasonable prices would hold down its usage once it is available in plentiful amounts. Given time, it is reasonable to assume that synthetic rubber will be developed to the point where it will match natural rubber property for property. Therefore, it might be advisable for government to continue its present participation in synthetic rubber production and research to close up any time lag.

There is equal justification in the demand of those that the government withdraw as quickly as possible from the synthetic rubber field and let private industry carry the ball. As long as there is complete or partial government control, private industry cannot be blamed for hesitating to invest millions of dollars in research, the results of which would have to be shared with competitors. Nor can private industry be blamed for shying clear of operating large-scale polymer plants with the government calling the tune and possibly occupying a competitive position itself.

The viewpoint of the Administration, as expressed by Arthur W. Hill, Chairman of the National Security Resources Board, favors maintenance of facilities for producing 600,000 tons of GR-S per year, a mandatory consumption ratio of ⅓ synthetic per year for at least the next two years, and continuation of specification controls. Although the Board favors transferring synthetic production to private industry, no mention was made as to when such transfer should occur.

In the light of all of the extenuating circumstances, it is apparent that the determination of national rubber policy should be delayed for another year or so. However, to foster the development of synthetic rubber to a point where it might actually be able to stand completely on its own feet, two actions should be taken immediately: (1) The present synthetic rubber plants should be sold or leased to private industry, with riders accompanying the sale or lease to guarantee continued production sufficient for security purposes; and (2) The patent pool which is currently in effect should be sufficiently modified so that major developments engineered by any single member of the pool should remain the sole property of that concern. These two actions would do more than any others to bring forth the type of polymer which would enable synthetic rubber to compete on equal terms in all respects with the natural product.

CURRENT NEWS OF THE MONTH

WASHINGTON HEARINGS ON SYNTHETIC RUBBER REVEAL DIVERGENCE OF INDUSTRY OPINIONS

THE divergent points of view of the rubber manufacturing industry itself, as well as of the major suppliers to that industry, were brought to the fore during the week of December 1st at Washington when the long heralded public hearing of the House Armed Services Committee was held. This is the committee which is headed by Paul R. Shafer (Rep., Mich.), which recently concluded a tour of the leading synthetic rubber and rubber manufacturing plants in the country and which is pledged to submit long term legislation on rubber to Congress shortly after the first of the year. The difficulties of shaping up legislation which would be acceptable to all segments of the rubber manufacturing field were very much in evidence during the turbulent hearing. The fact that pressure groups have not given up hope of snaring profits from the government synthetic rubber program was also quite evident.

One of the first to offer testimony at the hearing was A. L. Viles, president of the Rubber Manufacturers Association, who asked that existing legislative authority making the use of synthetic rubber mandatory in certain products be extended one year beyond next March when Public Law No. 24, which now affords such authority, expires. He presented a detailed report representing a consensus of the industry's wishes in connection with a five-year synthetic rubber program.

According to Mr. Viles, the prospective oversupply of natural rubber within a few years makes legislative assurance of active synthetic rubber production necessary. He emphasized the point that private industry would not undertake the job until research makes synthetic rubber "superior in every way." When such a point is reached, he indicated, the needs of national security will be satisfied with legislation.

Makes Additional Recommendations

The R.M.A. executive also recommended that the government keep in operation, or in standby condition, at least 600,000 long tons of GR-S capacity; the continuance in operation, or standby condition, of the two butyl plants, as well as sufficient facilities to furnish raw materials for both GR-S and butyl; and maintenance of synthetic rubber consumption at a rate permitting early acquisition of sufficient natural rubber to meet the stockpiling requirements of the government.

He estimated that if these suggestions were followed, total synthetic rubber capacity in operation or in standby condition would amount to 730,000 tons annually, which would include approximately 130,000 tons of existing neoprene and nitrile rubber facilities. He also urged that the National Security Resources Board be given authority to make final disposal of the government-owned synthetic plants rather than the Reconstruction Finance Corporation.

John L. Collyer, president of the B. F. Goodrich Company, who was former Special Director of National Rubber Programs and is an industry adviser on rubber to the State Department, outlined a three-point proposal in his testimony as follows:

Collyer Outlines Proposal

1. Restriction of government participation in rubber solely to an area necessary to guarantee military security. This would provide a means by which voluntary demands for general purpose American rubbers could be met by private producers, freeing the market for the development of an American rubber-producing industry.

2. Legislation to provide that existing government-owned American rubber-producing facilities be continually offered for disposal, by sale or lease, to industry. Such transactions can be accomplished on such terms and conditions as the National Security Resources Board may prescribe in the interests of national security in rubber. This policy would offer fair opportunity for capital to enter the general purpose rubber producing field. Fair opportunity does not now exist because of legal and contractual barriers.

3. Wartime agreements for the exchange of technical information pertaining to man-made rubber should be terminated in the interest of stimulating renewed private research and development in American rubbers. Future progress toward better, low cost rubbers is almost entirely dependent upon an early return to competitive activity in the fields of research and development.

Mr. Collyer also stated that if a problem on rubber for military security did not currently exist, the Goodrich organization would strongly recommend that the government withdraw from all phases of the rubber business, including stockpiling and operation of synthetic facilities. Since rubber is a strategic material, he recommended that the government continue only such stockpiling and synthetic production as is essential for military security.

Seiberling Voices Objection

Warning the Committee that for security reasons the sale of the government-owned synthetic plants to private interests should not be permitted until the national emergency rubber stockpile is built up, J. P. Seiberling, president of the Seiberling Rubber Co., stated that he also opposed private ownership of these plants "as long as the mandatory use of synthetic rubber is required by the government." He dissented sharply from the recommendation to permit decisions on sale of the plants be made by the National Security Resources Board.

Listing national security reasons for prohibiting early sale of the plants, Mr. Seiberling said unified government production control was necessary for a period during which "standby" production of 550,000 tons of synthetic annually could be maintained, a rubber stockpile could be built up, and consumers and the industry would be protected from the threat of skyrocketing crude rubber prices.

"Obviously, there can be no certainty that the facilities would be held in constant readiness for a possible emergency if such facilities were dispersed to private interests," he said.

Mr. Seiberling recommended that the proposed legislation "prohibit the sale or lease of the plants to private interests for one year, or until such time as the national emergency rubber stockpile is substantially completed."

Supporting his contention that the plants should not be sold to private companies as long as the government required use of synthetic rubber in tires, he pointed out that Seiberling Rubber and other companies which could not buy the plants, would be required to purchase synthetic rubber from competitors. "The private owner would have a real and possibly decisive competitive advantage," he said.

Mr. Seiberling's opinions were echoed by Robert A. Winters, executive secretary of the Rubber Heel and Sole Manufacturers Association, who urged that government ownership and operation of the synthetic plants be continued until the plants could be sold to companies or individuals outside of the rubber industry. He stated that the members of his association did not want to be placed in the position of having to buy one of their major raw materials from some of their biggest competitors.

Testimony of Other Executives

It was obvious after the first two days of the hearing that the most controversial

issue was whether disposal of the government-owned synthetic plants should begin immediately upon enactment of a new rubber law or be delayed until the rubber supply, demand, and price situations were clearer. As indicated above, immediate disposal of the plants was recommended by Mr. Collyer.

Appearing before the committee, Harvey S. Firestone, Jr., president of the Firestone Tire & Rubber Co., recommended piecemeal disposal of the synthetic plants to private industry with transaction details subject to approval by the National Security Resources Board. Fred A. Mayfield, of the General Tire & Rubber Co., also advocated such plant disposal, but recommended that Congress, as well as the N.S.R.B., set the disposal policy. Both of these executives agreed that the early accumulation of a strategic stockpile of rubber by the government was essential.

Both Robert S. Wilson, vice-president of the Goodyear Tire & Rubber Co., and George M. Tisdale, vice-president of the U. S. Rubber Co., urged that any decision to dispose of the synthetic rubber facilities be deferred until the national rubber stockpile was built up to satisfactory proportions. Mr. Tisdale stated that the shortage of natural rubber will be materially relieved in another 16 months and that a decision on the synthetic rubber industry should be deferred until such time. He criticized the piecemeal sale of plants as unsatisfactory at the present time.

Mr. Wilson concurred with this testimony and urged that Congress move very slowly and carefully on the disposal question. He stated that capacity of fully 600,000 tons should be maintained by the government, kept at extremely flexible operation, until an adequate stockpile of rubber has been secured and a complete workable program for plant disposal blueprinted. "National security," he added, "dictates continued operation as is until March, 1949."

H. F. Safford, vice-president of the Ohio Rubber Co., and J. F. Shaeffer, chairman of the board of the Cooper Tire & Rubber Co., also called for continuance of government controls beyond March 31, 1948, as a form of protection for smaller companies. Still another executive expressing this line of thought was Dan M. Rugg, vice-president of the Koppers Co., who stated that continued compulsory use of synthetic rubber is necessary "to keep the industry on its feet." Otherwise, he indicated, the synthetic rubber industry "might fold up in the event of an economic slump."

The opposite point of view, however, was expressed by H. W. Fisher, general manager, Chemical Products Dept., Standard Oil Co. of N. J., who declared that the synthetic rubber industry not only is ready to stand on its own feet but can give natural rubber a real race. Indicating that a vigorous synthetic rubber industry will develop in private hands, he added that such an industry would be of infinitely greater value to the country than any counterpart developed with subsidy, an artificially created market, or other such forms of government assistance.

Views of the Administration

Expressing the viewpoint of the Administration, William C. Foster, Undersecretary of Commerce, asked that the government be given authority to dispose of its synthetic rubber plants as a part of any rubber legislation voted by Congress during the coming year. He stated that the Commerce Department did not believe the plants should be turned over to private industry now but that it did believe that the most desirable program was to give the National Security Resources Board authority to dispose of the plants when it considers the time appropriate. He added that administrative agencies should always be given some degree of flexibility.

Continuing his testimony, Mr. Foster stated that the reluctance of private capital to enter into an industry that has not as yet had an opportunity to demonstrate its ability to survive under free competitive conditions was understandable. He stressed the point, however, that the Department believed the synthetic rubber industry should not be continued indefinitely as a government operation.

In concluding his testimony, the Undersecretary opposed the mere extension of the present rubber regulation, claiming that this would simply postpone the problem of establishing a long range rubber policy. Instead he urged legislation embodying the following points:

1. Continuation of government authority to control rubber usage.

2. Disposal of government-owned synthetic rubber plants and facilities subject to adequate safeguards.

3. Government authority to operate the remaining essential plants and to sell synthetic rubber on the basis of operating costs.

4. Continued government supervision of the synthetic rubber research program.

5. Semi-annual reports to Congress on the rubber program by the Commerce Department.

Government Losses Outlined

According to testimony offered by G. B. Hadlock, an administrative officer of the Reconstruction Finance Corporation, the government has lost $281,972,000 to date in the manufacture and sale of synthetic rubber. He denied that private companies could sell GR-S any more cheaply than the 18½c a pound which is currently the government's fixed price.

Mr. Hadlock testified that the government spent $697,000,000 in building and putting the synthetic rubber plants into operation. Of the $281,972,000 deficit accumulated to date, he stated that $247,491,000 is for depreciation of the plants and the net operating deficit amounts to $33,481,000.

His testimony indicated that the out-of-pocket expenses for materials and labor now runs between 14 and 14½c a pound on GR-S and that the 18½c a pound is necessary to cover depreciation and other charges. He admitted that the government has made a paper profit of approximately $62,000,000 on synthetic rubber since September, 1945, but that this figure does not include plant depreciation.

In answer to the question why the Canadian Government can afford to sell GR-S for 16½c a pound, Mr. Hadlock replied that that price covers only production expenses "and little or no recapture on depreciation."

Mr. Hadlock also testified that of the synthetic rubber facilities built in the wartime emergency program, 22 are currently in active operation, 16 are in standby condition, and the remaining 13 have been turned over to the War Assets Administration for disposal.

N.S.R.B. Asks For Legislation

A program for permanent rubber legislation, with which President Truman was said to be in general accord, was offered to the Committee during the hearing by Chairman Arthur M. Hill, of the National Security Resources Board. This board comprises six cabinet officers in addition to Mr. Hill who acts as its chairman. The permanent legislation requested would provide for the following:

1. For at least two years, at least one-third of all new natural and GR-S rubber consumed in this country should be domestically produced GR-S. After that, the proportion, not to exceed the present one-third, should be determined by the President.

2. Total annual operating and stand-by capacity should be maintained for at least 600,000 long tons of GR-S.

3. For at least two years, at least 4 per cent of all new rubber consumed should be domestically produced butyl and after that the President can lower the mandatory requirement.

4. Mandatory usage should be limited to automotive type tire casings and inner tubes and latex foam cushions.

5. A framework should be established for the transfer (with appropriate safeguards) of the Government-owned synthetic facilities either by sale or by lease to private industry. Facilities not thus transferred but necessary for a capacity of 600,000 long tons per annum should be maintained in standby condition by the Government.

6. Modification of the Government-industry patent pooling arrangement to the degree necessary for a sound basis for disposal of the Government-owned synthetic rubber producing facilities as well as to provide incentive for competitive research and development.

Conflict with I.T.O. Charter

Testimony to the effect that the present law covering the synthetic rubber industry in the United States conflicts with the proposed charter of the International Trade Organization currently being negotiated at Havana was offered by Rep. Curtis of Nebraska and was confirmed by Winthrop Brown, chief of the Commercial Policy Division of the State Department. The law permits the government to require a mixture of natural and synthetic rubber in certain imports.

According to the testimony offered, under the proposed charter no member nation would be allowed to specify that products imported from other countries must

contain any such mixture of ingredients. For example, the charter would prevent the United States instructing a British tire manufacturer to use synthetic along with natural rubber in tires he wants to sell in this country because American companies are required to do so.

It was indicated that if the United States accepts the I.T.O. charter, the present rubber law must be changed and as a result Congress may find it necessary to impose a higher tariff on imports of rubber products to protect domestic rubber manufacturers.

Other Testimony Offered

In addition to those cited above, a number of other executives from the rubber and allied industries offered testimony during the extended hearing at Washington. These included E. R. Bridgwater, manager, DuPont Rubber Chemicals Division; Ralph McCreary, vice-president, McCreary Tire & Rubber Co.; George Burger, independent tire dealer consultant; and Cecil A. Johnson, representing the Agricultural Products Research Foundation.

Mr. Johnson urged that legislation to preserve the synthetic rubber industry for national security reasons should include a provision requiring that some of the synthetic rubber be produced from alcohol derived from agricultural products. He warned that farm bloc senators would insist on inclusion of such a provision in any rubber bill which may reach the Senate from the House.

Speaking for the National Federation of Small Business, Inc., Mr. Burger urged that the use of synthetic rubber have equal opportunity to exist with that of natural rubber. He also recommended that any legislation finally evolved be clear and understandable so that it could not be twisted after its enactment. Another recommendation he made was that severe penalties be provided for any violation of the law.

Outline Function of Council

A circular outlining the organization and function of the National Inventors Council has been made available. The council is comprised of 16 nationally-known scientists, headed by Dr. Charles F. Kettering as chairman. The circular describes the council as a "clearing house for inventions and ideas which will assist the Army, Navy, and other public agencies in solving technical problems affecting the national defense and welfare." To this end the Council encourages private citizens to submit inventions and ideas which they believe will contribute to national defense and welfare. Copies of the circular are available from the Council on request. Communications should be addressed to National Inventors Council, Department of Commerce, Washington 25, D. C.

Kleinert Rubber has introduced a new line of casual shoes to supplement their Sportimer sandals. The company has also re-introduced its Off-Timer beach shoes for men. Color combinations mark both lines.

High Frequency Fellowship

The Firestone Tire & Rubber Co. has established a fellowship in the Department of Chemical Engineering of the University of Texas, at Austin, Texas, to encourage research in the field of high frequency dielectric heating, particularly as applied to rubber and its components. William A. Raatz, graduate student in chemical engineering, is the 1947-48 appointee. The Firestone fellowship augments one established by the Texas Cotton Research Committee at the university for research on the effect of high frequency heating on the destruction of infestations in cottonseed and the effect on enzyme systems that might enable seeds to be stored for longer periods of time with less deterioration.

Washable Play Shoes

U. S. Rubber Co. has announced a new line of washable play shoes for women. Known as U. S. "Strollers," they will be introduced this winter in Florida and in cruise shops throughout the country handling southern resort wear. Advantages claimed for the shoe include fade-proof colors, vulcanized construction, light weight, scientific design to give proper fit, and combination cork and crepe soles that provide insulation against hot pavements. The shoes will be distributed in 14 different styles and colors.

Issue Laboratory Directory

A complete listing of commercial and university testing and research laboratories throughout the country, together with indications of the type of commodities tested, has been compiled by the National Bureau of Standards. Information is given concerning 220 commercial laboratories, with 80 branches or offices, and 189 college laboratories used for research and testing as well as instruction. The compilation is entitled "Directory of Commercial and College Laboratories" and is known as NBS Miscellaneous Publication M187. Copies can be obtained from the Superintendent of Documents, Washington 25, D. C., at 30 cents per copy.

"Rug-Sealz" Carpet Adhesive

Development of a new adhesive described as "first-aid for carpets," has been announced by the U. S. Rubber Co. The material speeds and improves the technique of joining and edgebinding carpets and repairing damaged portions. "Rug-Sealz" is a self-curing, white rubber compound. When painted over binding tape or sewing, the material forms a tough, permanent seam invisible from the top side of the carpet. Either alone or with tape it prevents the fraying of raw edges. One pint, applied with a brush or dauber, covers an area of carpet backing nine feet square, and will antiskid the carpet.

OIL LINE SCRAPER MADE FROM HYCAR DISCS PROVES EFFECTIVE MEDIUM

A new oil line scraper with excellent resistance to oil, wear, swelling and deterioration has been made by the Pioneer Rubber Company, of San Francisco, California. The scraper is made from a series of ten 18½ by 1¾-inch Hycar discs mounted on a metal core and is shown being pulled from a crude oil pipeline after completing a 40 mile run with no damaging effects. The scraper is run through the pipe lines when excessive pumping pressures indicate the resistance of accumulated paraffin on the sides of the oil lines. A scraper similar to the one shown was left in an oil trap for over three weeks with no apparent swelling.

U.S. TARIFF CONCESSIONS ARE EFFECTIVE JANUARY 1

The general trade and tariff agreements recently signed at Geneva by twenty-three nations are expected to prove of specific benefit to each of the countries involved. The tariff reductions incorporated in the agreements range up to 50% of present rates on major imports and affect fully 60% of United States trade.

The United Kingdom, for example, lowered the duty on rubber tubing and piping by one-third; Newfoundland bound rubber boots free; the margin of British preference on various products, including sole leather was reduced substantially.

In the trade and tariff agrements signed at Geneva, the United States reserved a special avenue of escape on tariffs as applied to rubber manufactures. The pact specifies: "The United States reserves the right to withdraw its concessions on rubber and certain rubber manufactures wholly or in part of rubber if such action becomes necessary to safeguard the synthetic rubber program."

The revised tariff rates which are effective January 1, 1948, on imports of rubber products into the United States are covered in Schedule XX (United States of America) of Tariff Concessions. This schedule sets forth the Tariff Act of 1930 Paragraph Number, includes a description of products, and indicates the new rate of duty. Excerpts from Schedule XX, with the new duty rate shown, follow herewith:

Rates on Imported Products

Automobiles, motorcycles, and bicycle tires composed wholly or in chief part of rubber, 10% ad valorem.

Molded insulators and insulating materials, wholly or partly manufactured, composed wholly or in chief value of rubber or gutta-percha, 15% ad valorem.

Hard rubber products not specially provided for, finished or unfinished—syringes, 17½% ad valorem; other, 12½% ad valorem.

Combs of whatever material composed, except combs wholly of rubber or metal, not specially provided for, valued at more than $4.50 per gross, 3c each and 20% ad valorem.

Boxing gloves, lawn-tennis balls, golf balls, etc., not specially provided for 15% ad valorem.

Packing, gaskets and valves, of rubber or gutta percha, or of which either of these substances is the component material of value, 12½% ad valorem.

Hose and tubing, having at any point an inside diameter of less than ⅜ inch, suitable for conducting liquids or gases, 12½% ad valorem; hose and tubing, having at no point an inside diameter of less than ⅜ inch, 10% ad valorem.

Gloves, nursing nipples and pacifiers, and catheters, drains, bougies, sondes or other urological instruments, 12½% ad valorem.

Golf ball centers or cores, wound or unwound, 12½% ad valorem.

Tires (except automobile, motorcycle or bicycle tires), 12½% ad valorem.

Boots, shoes or other footwear, wholly or in chief value of rubber, $1.50 per dozen pairs, but not less than 12½% nor more than 25% ad valorem.

Elastic fabrics of whatever material composed, knit, woven or braided in part of rubber, 25% ad valorem.

Articles manufactured of synthetic rubber, not specially provided for, 10% ad valorem.

Resume Buna Production

The chemical works at Huels in Marl-Huels, Westphalia, formerly operated by I. G. Farbenindustrie, recently resumed the production of buna rubber, according to advices from Berlin. The plant formerly contributed a substantial amount of buna to German industry. Other products being made at the plant include synthetic resins, linseed oil, glue and washing powders.

STATUS OF 1948 MEETINGS OF ACS RUBBER DIVISION

The 1948 meetings of the Division of Rubber Chemistry, ACS, were the subject of a recent discussion of the Executive Committee. It has been definitely decided that the Spring Meeting will be held in Chicago, Ill., from April 21 to 23, in conjunction with the 113th Meeting of the parent society. The arrangements for this meeting will be handled by a local committee headed by Robert C. Dale (Inland Rubber). Headquarters will be at the Sherman Hotel.

The time and place of the Fall Meeting have not been definitely decided. The A.C.S. will hold divided meetings, one in Washington, D. C., August 29 to September 1, one in St. Louis, Mo., Sepetmber 6 through 10, and one in Portland, Ore., September 13 to 17. Normally, the Rubber Division would meet with the society at Washington, D. C., but the Executive Committee has decided to hold its meeting separately and accordingly the Division's Fall Meeting will be held after October 1, either at Detroit or New York, more likely Detroit.

The Division received an invitation from the Los Angeles Rubber Group to hold one of its 1948 meetings in that area, but the invitation was declined because of the traveling distance involved. However, the possibility of holding a Regional Meeting in Los Angeles is being investigated, and if sufficient papers are forthcoming there is a good probability that such a meeting will be scheduled some time between June 1 and August 1.

Goodyear to Buy GR-S in Canada

The Goodyear Tire & Rubber Co. of Akron, Ohio, is negotiating for the purchase from the Polymer Corp., Ltd., synthetic rubber plant at Sarnia, Ontario, of 180,000 pounds a month of GR-S latex, with a monthly value of $30,000 to $40,000, Robert S. Wilson, vice-president in charge of sales, said recently.

CENTRAL RUBBER LIBRARY BEGINS TO TAKE ON SHAPE

As reported in previous issues, the Division of Rubber Chemistry of the American Chemical Society is sponsoring the development of a comprehensive central library on rubber technology which will be a part of the Bierce Library at the University of Akron. Additional data on plans for the library was recently made available.

The first step in the development of the library will be the establishment of a specialized Union List of Serials to be available through the Bierce Library. This list will cover all those journals of special interest to investigators in the fields of rubber, resins and plastics. The journals will be available through the University of Akron on inter-library loans.

The operation of the list is simple. For instance, if an investigator in Louisville wants to study articles published in journals which are not available locally, but which are on the Union List, he can arrange to borrow those journals through the library in Louisville. Specific journals may be available either in the original or in microfilm.

The initial Union List has been made possible by the cooperation of Firestone, General Tire, Goodrich, Goodyear, U. S. Rubber and the University of Akron. It will be available in January, 1948. It is hoped that other libraries having sections devoted to the rubber and plastics field will cooperate so that the list of available journals can be as complete as possible. Libraries which are interested in participating are invited to write either to the Librarian at the University of Akron, Akron, Ohio, or to the Chairman of the Committee for a Library of the Division of Rubber Chemistry (B. S. Garvey, Jr., c/o Sharples Chemicals Inc., 123 S. Broad Street, Philadelphia 9, Pa.)

Where journals are missing the Division of Rubber Chemistry will help fill in the gaps. This help will take two forms. Through the facilities of the American Chemical Society it will help to locate the missing journals for purchase. In some cases the journals will then be bought by a cooperating library to complete its own set. In other cases the journals will be bought by the Division of Rubber Chemistry and deposited in the Bierce Library.

Thus through cooperation and purchase the Division of Rubber Chemistry hopes to build up a very complete set of journals in this special field. The preparation of the Union List is being financed by the Division of Rubber Chemistry and the work is being done by the members of its Library Committee.

The original recommendation for this activity of the Division was made by a special committee appointed by Dr. W. A. Gibbons (U. S. Rubber) consisting of E. B. Babcock (Firestone), C. W. Christensen (Monsanto), H. E. Fritz (Goodrich), C. P. Hall (C. P. Hall), and R. P. Dinsmore (Goodyear). W. W. Vogt (Goodyear) appointed B. S. Garvey, Jr. (Sharples) as chairman of the Library Committee to implement the recommendation.

HARRIMAN FOREIGN COMMITTEE SUGGESTS STOCKPILING DELAY

The Harriman Committee on Foreign Aid suggesed last month that the government postpone further purchasing for its strategic stockpile of natural rubber until 1949. The suggestion was made in a section of the Committee's report to President Truman prepared by its Consumer Goods Subcommittee, headed by John L. Collyer, president of the B. F. Goodrich Co.

Noting that the "supply of crude rubber will be insufficient to meet world requirements in 1947 and 1948," the committee said: "The United States now owns a substantial stockpile of crude rubber. This amount can be increased at some future time when there is no deficiency in supply and no danger of additional Government purchases contributing to inflation.

"Government purchases for stockpiling purposes could help offset some of the costs of rehabilitation in Great Britain and Holland, the principal sources of crude rubber." This latter statement, it should be noted, simply states the affirmative effect of Government purchase of rubber from foreign countries upon their economic rehabilitation. It would place more dollars in hands of Great Britain and Holland.

The statement does not detract from the anti-inflation argument presented by the Collyer subcommittee in support of postponing the stockpiling program until supply and demand are in balance. They will not be in balance until 1949, the report states.

As for satisfying Europe's immediate needs for raw materials, the committee said "exports of American-made (synthetic) rubber could be at least three times the current rate without requiring an increase in the current domestic production of GR-S (general purpose synthetic rubber) or other types of American-made rubber."

The committee said "no difficulty should be experienced in meeting the demands of other countries for reclaimed rubber. "World needs for carbon black," another raw material for rubber production, "can be satisfied from the combined production of channel black and furnace black, but the ratio of channel black, which is preferred for crude rubber, to the total cannot be as high as rubber manufacturers throughout the world would prefer."

Conveyor belting is the only major rubber product which the United States will not be able to export in sufficient quantity to meet European demands next year and possibly through most of the Marshall program period, the Collyer committee said.

The committee, noting that European demands for conveyor belting in 1948 alone are equal to about half of United States domestic production, recommended careful screening of these requests.

The committee said: "Conveyor belting is the only major rubber product where a serious shortage exists. Production capacity is being increased, but the outlook for 1948 is that domestic demand will exceed the total production of that year."

Coming Events

Jan. 8. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.
Feb. 6. Akron Rubber Group, Hotel Mayflower, Akron.
Feb. 6. Chicago Rubber Group.
Feb. 12. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.
Feb. 13. Connecticut Rubber Group.
Feb. 20. Detroit Rubber & Plastics Group.
Mar. 8-20. American Toy Fair, Hotel McAlpin, New York.
Mar. 11. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.
Mar. 17. Boston Rubber Group, Hotel Somerset, Boston.
Mar. 26. Chicago Rubber Group.
Apr. 8. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.
Apr. 16. Akron Rubber Group.
Apr. 21-23. Rubber Division, A.C.S., Spring Meeting, Hotel Sherman, Chicago.
May 7. Chicago Rubber Group.
May 13. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.
May 14. Connecticut Rubber Group.
May 21. Detroit Rubber & Plastics Group.
June 18. Akron Rubber Group, Outing
June 21-25. A.S.T.M., Annual Meeting, Book-Cadillac Hotel, Detroit.
Sept. 24. Boston Rubber Group, Somerset Hotel, Boston.
Dec. 17. Boston Rubber Group, Somerset Hotel, Boston.

Dissolve Abrasive Association

Dissolution of the Grinding Wheel Manufacturers Association, whose members produce approximately 95% of all abrasives made in the U. S., was ordered in Federal District Court on November 19, at Boston, Mass. The judgment also prohibits any agreement among manufacturers fixing prices, discounts or other terms of sale, or establishing classifications of customers. The association and five manufacturers were named in the anti-trust proceedings. The defendant companies consenting to the judgment included the Carborundum Co., Niagara Falls, N. Y., Bay State Abrasives and Products Co., Westboro, Mass., Simonds Abrasive Co., Philadelphia, Penna., and the Macklin Co., Jackson, Mich.

A 20,000-pound capacity Otis power truck elevator, designed to handle the heavy duties imposed in plants where industrial type trucks are used to move materials, is being installed in the Youngstown, Ohio, plant of Republic Rubber.

A new 4-page bulletin on its "Tool Steel Process" sheaves and pins, which are said to increase rope life from 2 to 8 times over ordinary sheaves, has been made available by the Tool Steel Gear & Pinion Co., Cincinnati 16, Ohio.

EUROPEAN RUBBER PRODUCTION REPORTED AT HIGH CAPACITY

"The increasing trend to motorized transportation throughout Western Europe has resulted in a high level of rubber goods production that far exceeds prewar," reported C. A. Carlton, Technical Director, Rubber and New Products Division, J. M. Huber Corporation, New York, on his return last month after a six week survey of Europe's rubber centers. Mr. Carlton visited England, Sweden, Holland, Belgium, France, Italy and Switzerland.

"Today, many shippers faced with inadequate railroad transportation due to a serious lack of locomotives, box-cars and rails, have turned to trucks and trailers in increasing volume for the rapid transit of their products. And Europeans, with no gas available for their private cars to get about, have increased the demand for more motor coaches, buses, bicycle tires and rubber footwear," said Mr. Carlton. "Increasing dependence on rubberized transport," he continued, "has placed rubber manufacture and the necessary compounding ingredients in a priority class."

"Although rubber plants in Europe are operating at maximum production levels, the supply continues to fall far short of demand. Swedish manufacturers are faced with a critical shortage of power. Relying almost entirely on water as the source of power for electrical generation, production has been greatly reduced by the longest drought on record."

As to be expected, conditions are nearer normal in Switzerland than elsewhere in Europe. Rubber production in the centers of Milan and Turin in Italy is recovering rapidly, and in most countries is now exceeding pre-war levels.

In some cases, government agencies are acting as purchasing agents and distributors for many raw materials that are used in the manufacture of transportation items including tires. This is particularly so in the supply of carbon black.

Cites Expansion Difficulties

In discussing the difficulties of expansion faced by European rubber manufacturers, Mr. Carlton cited the shortage of materials for new building, as well as the inability to obtain new equipment.

Other serious shortages with which the European rubber industry has to contend, are carbon black and clays for rubber compounds. In both England and France, to save rapidly dwindling dollar reserves, the import of superior American clay is not permitted.

Discussing the general outlook for the European rubber industries, Mr. Carlton said that almost without exception management and production men expressed the feeling that it would take one or two years to catch up with tire needs and several years longer to meet the demand for mechanical rubber goods.

In Amsterdam, Zurich and Basle, Mr. Carlton addressed several technical groups from European rubber factories. He told them that American carbon black producers have extended themselves to meet the increased world-wide demand, and that shipments in 1947 will exceed 1946.

ASME RUBBER AND PLASTICS DIVISION HOLDS MEETING IN ATLANTIC CITY

Three papers on plastics and three papers on rubber, plus an interesting symposium on non-metallic bearings, featured the meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers, held at the Chalfonte-Haddon Hall Hotel in Atlantic City, N. J., on December 4, in conjunction with the 68th Annual Meeting of the parent society. It was one of the Division's best-attended meetings to date, approximately 100 members and guests sitting in on the Plastics Session, held during the afternoon, and about 75 at the Rubber Session, held in the evening.

At a combined meeting of the Executive Advisory and General Committees of the Division, J. F. Downie Smith, of Iowa State University, was elected as chairman for the 1947-48 period, and D. H. Cornell, of the B. F. Goodrich Co., was re-elected secretary. For the coming year the Executive Committee is comprised of Dr. Smith, F. W. Warner, W. Newlin Keen (DuPont), and Glenn W. Neely (Richardson Co.). The Advisory Committee includes J. H. Booth, E. F. Riesing, G. M. Kline, F. L. Yerzley, and H. M. Richardson, the latter the retiring chairman.

Members of the General Committee include the following: James Bailey, F. Haushalter, J. H. Teeple, M. E. Lerner, Fred J. Wehmer, S. K. Moxness, A. V. Tobolsky, E. N. Cunningham, Colin Carmichael, John Delmonte, R. W. Seaman, Howard Nason, R. K. Witt, and W. N. Findley.

Special paper committees were also organized at the meeting, with Mr. Keen named chairman of the Rubber Papers Committee and Mr. Neely as chairman of the Plastics Papers Committee. Dr. Smith, who has acted as Research Secretary in the past, revealed that a comprehensive article on what mechanical engineers expect from rubber research will appear in an early issue of *Mechanical Engineering*, official journal of the society. Dr. G. M. Kline (National Bureau of Standards) was appointed Research Secretary for the forthcoming year, in connection with the preparation of similar material on plastics.

Papers at Rubber Session

At the Rubber Session, held in the evening, L. K. Youse (Gilmer) acted as chairman, with Sherman R. Doner (Manhattan Rubber) as recorder. The first paper, entitled "Silicone Rubber — New Properties for Design Engineers", prepared by George S. Irby, Jr., Wyman Goss, and James J. Pyle, of the General Electric Co., Pittsfield, Mass., was delivered by Mr. Irby.

First tracing the physical and chemical properties of Silicone rubber, and explaining that it is being produced by two different chemical processes, Mr. Irby stressed the point that the molecular structure of the gum, which differs greatly from that of natural rubber, gives it unique properties of thermal stability. This stability is maintained not only over a temperature range of —70° F. to +500° F., but also over long periods of heat aging. Other advantages, including resistance to oxidation, low compression set, and good electrical properties, were also discussed.

Mr. Irby also outlined a number of interesting applications for Silicone rubber. Among these were industrial gaskets used in a 16-cylinder Diesel engine where operating conditions were 300° F. and 15 p.s.i. pressure, and which eliminated frequent replacement of the gasket. Another was an "O" ring design which provided an effective oil and air vapor seal on the TG-180 jet engine. One quality of Silicone rubber important in these applications is the fact that it has no tendency to stick or adhere to metallic or non-metallic surfaces. Bonding of Silicone Rubber to itself, glass or metal can now be accomplished with the use of a newly-developed adhesive.

"Rubber in the Automotive Industry," presented by R. K. Williams of the Research Laboratories Division, General Motors Corp., Detroit, Mich., was the second paper at the session. Mr. Williams traced the numerous applications of rubber in the modern automobile, stressing the rubber parts made possible by the development of synthetic rubber. For example, virtually all joints in the front suspension and steering systems are protected by means of oil-resisting synthetic rubber seals where exposed to road dirt. The same is also true of shock absorbers.

The latter portion of Mr. Williams' talk was based on recently-determined methods of securing proper compounds for given applications, and in this respect he reviewed the joint work of the Society of Automotive Engineers and the American Society for Testing Materials in drawing up classified tables containing identification numbers, physical properties and test methods covering virtually every conceivable compound that would be used in the automotive and mechanical goods industries. Some of the limitations of this system of classification were also cited by the speaker.

The annual report on "Advances in Rubber" was prepared this year by V. A. Cosler and S. W. McCune, III., of the DuPont Rubber Chemicals Division, Wilmington, Del., and was delivered by Mr. McCune. Mention was made of improved elastomers of all types, new reclaiming agents, developments in the construction of tires, rubber parts for vibration isolation, studies of testing methods, new methods of evaluating physical properties, and evaluation of numerous compounding ingredients in rubber stocks. (EDITOR'S NOTE: This report will appear in our next issue).

Papers at Plastics Session

D. H. Cornell (Goodrich), secretary of the Division, acted as chairman of the Plastics Session, held during the afternoon. The first paper at this session was by Lawrence Wittman, Republic Aviation Corp., Farmingdale, L. I., N. Y., on "Plastic Tooling Comes of Age." Mr Wittman discussed material characteristics, design considerations, and adaptability of plastics to tooling in the aviation and other industries. He outlined a number of additional possible applications based on present techniques and displayed a number of actual samples for emphasis.

Results of mechanical tests on macerated phenolic molding material were covered by Prof. W. N. Findley of the University of Illinois, Urbana, Ill., in a paper on "A Phenolic Molding Material Under Fatigue, Impact, Creep and Static Loads." Results were reported on tests covering static tension, compression, torsion, flexure, long-time creep, fracture, impact, bending fatigue, and rotating fatigue.

J. W. Underwood, of the General Electric Co., Pittsfield, Mass., prepared and delivered the report on "Major Plastics Developments During 1947." One of the outstanding developments, he stated, was the use of plastics as drugs in connection with the treatment of stomach ulcers. The only really new material offered to the trade in 1947, he said, was diallyl phenyl phosphonate, which has a high index of refraction, an ability to wet glass fibers, and flame resistance. Another development he mentioned was the use of silicone resins for sizing paper.

Four speakers participated in the Symposium on Non-Metallic Bearings. These were A. Bednar (Lucien Q. Moffitt), H. V. Townsley (Lignum Vitae Products), and L. E. Caldwell and John Boyd (Westinghouse). A representative of the E. J. Willis Co., of New York, also participated in the symposium, and explained the operations of a new type of rubber bearing, in which the rubber rotates inside of a metal ring.

An interesting display presenting a visual and audible demonstration of the splitting of the uranium atom was a feature of the annual meeting itself. Also displayed were three-dimensional graphics depicting the economics of free enterprise, as well as the laws of supply and demand. Compiled by the Willys-Overland Motors Corporation, these displays attracted considerable attention.

Johns Manville Buys Van Cleef

The purchase of Van Cleef Bros., Inc., of Chicago, Ill., was announced by the Johns-Manville Corp. on December 6. Financial details of the transaction were not made public, but it was stated that Van Cleef will be operated as a wholly-owned subsidiary of Johns-Manville, and that no change is being made in the manufacturing, merchandising or distribution system of the company. On December 3, the firm of Morgan, Stanley & Co., New York brokerage house, announced that it was heading a group to make a secondary offering of approximately 43,000 shares of common stock of the Johns-Manville Corp. to be issued in connection with the purchase of Van Cleef.

Reduce Geon Polyblend Price

As a result of increasing production, the B. F. Goodrich Chemical Co., Cleveland, Ohio, has announced a reduction in the price of Geon Polyblend 500 x 503 from 45c to 42c per pound, in lots of 30,000 pounds or more. When first introduced, this material sold at 50c per pound. The company recently announced price reductions on several of its Geon latices.

ANNOUNCE POLYMER LECTURE SERIES FOR 1947-1948 SEASON

The 1947-1948 series of lectures at the National Bureau of Standards, Washington, D. C., dealing with the properties of high polymers, has been announced by Dr. E. U. Condon, Director of the Bureau. The program, which continues the seminars presented the last two years, includes leading scientists in this field from industry and universities.

The lectures, arranged by Dr. Robert Simha of the Bureau's Division of Organic and Fibrous Materials, are open to the public without charge, and will be held from 7:00 to 9:00 p.m. in room 204 of the Chemistry Building, National Bureau of Standards.

The program consists of eight lectures, two of which have already been held:

November 18: *The Creep and Flow of Plastic Materials,* by H. Eyring, University of Utah.

December 4: *Poliferous Polymerization,* by G. S. Whitby, University of Akron.

Lectures to be held during 1948 include:

January 22: *Hydrolysis of Proteins,* by H. B. Bull, Northwestern University.

February 5: *Hysteresis of Elastomers in Cycles of Elongation: Temperature and Frequency Effects,* by M. Mooney, U. S. Rubber Co.

March 25: *Polyelectrolytes,* by R. M. Fuoss, Yale University.

April 29: *Size and Shape of Protein Molecules,* by J. L. Oncley, Harvard Medical School.

May 27: *Solution Properties of Cellulose Derivatives—Correlation with Physical Properties,* by H. M. Spurlin, Hercules Powder Co.

Submicroscopic Silica Powder

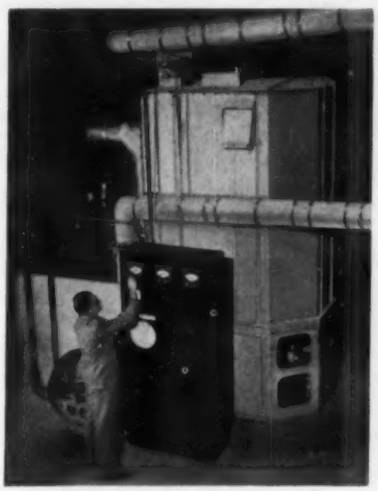
Silica powder of high purity and submicroscopic fineness is now being produced in pilot plant quantities by the Linde Air Products Co., unit of Union Carbide and Carbon Corp., New York. Preliminary investigations indicate that this powder may reveal new and effective applications in rubbers, elastomers, textiles, paints, lacquers, and lighting. This silica powder, over a wide range of concentrations, has been found to disperse in, or blend satisfactorily with, most organic or inorganic media and to remain in a stable homogenous form indefinitely. Reinforcing effects are possible in its application to specialty rubbers and elastomers, where any introduction of color would be undesirable. This new product is available in 1, 5, and 10 pound lots.

Cite Rubber Stamp Concerns

The Federal Trade Commission on November 25 charged the Krengel Manufacturing Co., Inc., and Adolph Gottscho, Inc., both of New York City, and their officers, with price discrimination in the interstate sale of rubber stamps. Although both concerns sell to retail dealers, such sales are not involved in the FTC complaints, which are directed exclusively against discrimination in direct sales to consumers.

Demonstrate Heat Transfer Medium

A new type of heat transfer medium for supplying heat to industrial processes at unusually high temperatures, developed by the Bethlehem Foundry and Machine Co., Bethlehem, Penna., in cooperation with



E. I. du Pont de Nemours & Co., Inc., was demonstrated at Lehigh University in Bethlehem on December 9. Known as the Beth-Tec Unit, it is offered as a completely automatic, self-contained "package" consisting essentially of a vertical water tube type of boiler. Suitable for working temperatures up to 850°F., the heat transfer medium used is a mixture of salts which is said to have proved to be the only commercially feasible material to transfer heat in the broad range between flame and steam temperatures. Specific advantages claimed for the Beth-Tec Unit include the following: there is no appreciable vapor pressure; the degree of heating is easily controlled; the coefficient of heat transfer is good—the low temperature difference required is an advantage in the design of equipment to operate at high temperature and high pressure; and the possibility of toxic fumes or vapors is remote. The unit, which is illustrated herewith, is said to have potentiality in the rubber, plastics, food, chemical and other industries.

Geon Latex 31X Available

Geon Latex 31X, a polymer furnished as a colloidal dispersion of modified vinyl resin in water containing 55% total solids, has been made available by the B. F. Goodrich Chemical Co., Rose Building, Cleveland 15, Ohio. The new latex forms strong films and coatings having good adhesion to paper, fabric, leather, wood, etc., by simple room temperature drying, the films and coatings normally containing no plasticizer and having low moisture vapor transmission. Besides forming film, Geon Latex 31X can be used as a laminating agent which requires neither heat nor pressure. In addition, it is reported to demonstrate good coagulant dip characteristics when used in conjunction with Hycar OR-25 latex. Its pH ranges between 7 and 8.5.

AKRON POLYMER LECTURE GROUP ANNOUNCES SCHEDULED MEETINGS

The Akron Polymer Lecture Group, organized under the auspices of the University of Akron, Akron, Ohio, has announced its program of lectures for the 1947-1948 season. All meetings will be held at the University of Akron, and will commence at 7:30 p.m. Meetings already held include:

October 3: *Light Scattering and Viscosity,* Professor P. Debye, Cornell University.

November 7: *Initiators, Retarders and Inhibitors in Vinyl Polymerization,* Professor Paul D. Barlett, Harvard University.

December 5: *Copolymerization,* Dr. Frank R. Mayo, U. S. Rubber Co.

Meetings scheduled during 1948 include:

January 9: *Molecular Weight Distribution,* Professor Walter H. Stockmeyer, Massachusetts Institute of Technology.

February 6: *Solution Properties of Cellulose and Its Derivatives,* Dr. Harold M. Spurlin, Hercules Powder Co.

March 5: *Electrical Properties of Polymers,* Professor Raymond M. Fuoss, Yale University.

April 2: *Plasticization and the Second-Order Transition Point,* Dr. Raymond F. Boyer, Dow Chemical Co.

April—: Dr. Geoffrey Gee, British Rubber Producer's Research Association. (Date and title to be announced.)

Nuso 250 Plasticizer

The availability of Nuso 250, a new high viscosity petroleum plasticizer, has been announced by the Engineering Division, Sales Department, Standard Oil Co. of N. J., 15 West 51st St., New York 19, N. Y. The new plasticizer is said to supply the need for a product with a softening power as great as Nuso 55 but with higher viscosity, and for a product of the Coray 230 type but with greater compatability with oil-resistant synthetic rubbers. Its high viscosity is said to minimize the tendency of the plasticizer to migrate to the surface of finished rubber articles, particularly under high vulcanizing temperatures and prolonged vulcanizing time. It does not tend to darken light colored stocks. Nuso 250 has an API gravity of 11.5, a specific gravity of 0.989, flash point of 470° F., pour point of plus 50° F., and an aniline point (ASTM D-611) of 120° F.

Goodyear Drops 6 Hour Day

The Goodyear Tire & Rubber Co. and the C.I.O. United Rubber Workers on November 19 signed a working agreement marking the first departure from the six-hour day in rubber shops in Akron since the end of the war. The agreement, approved by a 688-to-12 vote of union members, included provisions for an eight-hour day and forty-hour work week, plus an 11½ cents hourly wage increase, paid vacations and other concessions. Some 1,000 workers employed in Goodyear's new $10,000,000 plant in Akron will be affected by the new contract. The factory is scheduled to begin production in January.

FINANCIAL NEWS

GOODYEAR TIRE ANNOUNCES CAPITAL FINANCING PROGRAM

Subject to approval by preferred stockholders at a special meeting on December 15, the Goodyear Tire & Rubber Co. plans a $100,000,000 financing program to capitalize post-war expenditures already made and to provide for additional plant machinery and working capital, the company announced on November 17.

Under the plan, the company's outstanding $36,090,000 of 3½% first mortgage and collateral trust bonds, due 1964, would be replaced to the extent of $31,580,000 by unsecured notes at the same interest rate and security. At the same time the company would borrow from the insurance companies holding the bonds $68,420,000 on unsecured 3% notes.

The company points out that this refunding of the bonds and the increase of $63,910,000 in funded debt involves no underwriting expense. The increase in debt is subject to approval by holders of two-thirds of the preferred stock.

P. W. Litchfield, chairman of the board, said that current sales volume is about $600,000,000 a year, compared with $200,000,000 before the war; that to keep pace with the expansion $100,000,000 has been authorized for improvements, of which $70,000,000 has been paid out of working capital; and that the working capital has been increased to about $175,000,000, but even this position may not be adequate for present business without bank borrowings to finance accounts receivable and inventories.

Minnesota Mining and Mfg. Co.

Nine Months: Net income of $8,381,830, which is equal to $4.30 each on 1,951,530 capital shares, and compares with 6,593,330 or $3.38 a share last year. Net sales of $68,550,239 increased from $52,309,301 for the comparable period last year. Net income for the September quarter was $2,785,881, or $1.43 a share, on sales of $23,503,144, against a net income of $2,898,324, or $1.49, on sales of $20,009,469 for the September quarter of 1946.

Columbian Carbon Co.

Nine Months: Net income of $4,680,587, equal to $2.90 a share, which compares with $3,747,538, or $2.32 a share, in the corresponding 1946 period. For the third quarter, net income amounted to $1,449,328, or 90c a share, as compared with $1,079,347, or 67c a share, in the third quarter of last year.

Raybestos-Manhattan, Inc.

Nine Months: Net profit of $1,502,914, or $2.39 a share, which compares with $1,014,310, or $1.61 a share for the corresponding period last year.

Propose Anaconda Stock Split

The Anaconda Wire and Cable Co. has called a special meeting of stockholders for December 23 to vote on a proposed increase in authorized capital stock from 1,000,000 to 2,000,000 shares. If approved, the company's capital stock, of which about 70% is owned by Anaconda Copper Mining Co., will be split, two shares for one.

Anaconda Wire & Cable Co.

Nine Months: Preliminary report indicates net income of $6,492,996, after taxes and contingencies, which is equivalent to $15.39 a share on 421,981 capital shares, and which compares with $2,100,301, or $4.98 a share, reported for the corresponding period of 1946.

United Carbon Company

Nine Months: Net profit of $2,318,646, which is equal to $2.91 a share, and which compares with $2,107,507, or 2.65 a share, last year.

A recommended commercial standard for colors for molded urea plastics has been adopted by the National Bureau of Standards. The new standard, designated as CS-147-47, is effective as of December 15, 1947.

Arrangements have been completed for the handling by Borg-Warner International of the export activities of the Asbestos Manufacturing Company, according to a joint statement issued by officials of the companies.

U. S. Rubber is distributing a new V-belt catalog containing comparison tables, selection data and other detailed information on V-belts for electric refrigerators, home workshop equipment, ironers, farm appliances, oil burners, stokers, etc.

A new catalog section on its line of industrial fire hose for mill and plant protection has been published by Goodrich.

Plans for the construction of a new manufacturing unit to produce adequate quantities of the agricultural spray material, Good-rite polyethylene polysulfide (p.e.p.s.), have been announced by Goodrich Chemical. The new unit will be installed in the company's plant in Akron.

Silicone rubber gaskets that do not adhere to metal, withstand temperatures as high as 400°F., and which are said to maintain their original characteristics under high vacuum, are now being incorporated in chemical reactors used in the manufacture of G-E Glyptal alkyd resins.

Producing Hydroabietyl Alcohol

Commercial production of a new low-cost resin alcohol made from rosin, which has potential application in a wide number of industries including textile, rubber, adhesive, detergent, paint, varnish, and lacquer, has been announced by the Hercules Powder Co., Wilmington, Delaware. The new product is called hydroabietyl alcohol, and is the first commercially available primary alcohol to be developed from rosin. Hydroabietyl alcohol is a viscous liquid at room temperature. It is colorless, tacky, and not miscible with water. It is also highly resistant to discoloration and degradation by light or air, the manufacturer claims. Commercial production of hydroabietyl alcohol will be carried out in a unit of Hercules' new plant at Burlington, New Jersey. This $3,000,000 plant was designed especially for the production of chemicals derived from rosin.

Acquires Chemical Corporation

Koppers Company, Inc., has acquired all the stock of the Manufacturers Chemical Corporation and its sales subsidiary, the Chemaco Corporation, both of Berkeley Heights, N. J. The purchase was made by issuing shares of Koppers common stock to the owners of the purchased corporations in exchange for their previous holdings. The newly-acquired companies will be operated as wholly-owned subsidiaries of Koppers. Since Koppers is a producer of polystyrene at its Kobuta, Penna., plant, addition of the New Jersey plant will enable the company to meet specifications of both large and small users for coloring and compounding plastics, and to supply materials not formerly produced.

Diamond Takes Over Distribution

For many years Kalite and Kalvan have been sold to the rubber manufacturing field by the R. T. Vanderbilt Co. According to the Pure Calcium Products Division of the Diamond Alkali Co., Painesville, Ohio, this sales arrangement will be changed, effective January 1, 1948. After that date Kalite will still be available, but Kalvan will no longer be manufactured, the announcement stated, but a similar material known as Multiflex will be offered to the rubber industry. Both Kalite and Multiflex will be warehoused and sold through branch offices of the Diamond Alkali Company.

Organize Sindar Corporation

The formation of the Sindar Corporation to take over the activities formerly carried out by the Industrial Products Division of Givaudan-Delawanna, Inc., has been announced by that company. The new concern will be devoted to the manufacture and sale of industrial aromatics, antiseptics, preservatives, stabilizers, etc., for such industries as rubber, paint, textile, paper, inks and plastics. Headquarters for the Sindar Corporation will be maintained at 330 West 42nd St., New York 18, N. Y. Canadian sales will be handled by Stuart Bros., Ltd., of Montreal and Toronto.

FOR BALANCE BETWEEN

RESILIENCE

TENSILE

STATEX-B

IS BEST

COLUMBIAN CARBON COMPANY

500 TONS OF SMOKE A DAY

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

MPC (Medium Processing Channel)
STANDARD MICRONEX

◆

EPC (Easy Processing Channel)
MICRONEX W-6

◆

VFF (Very Fine Furnace)
STATEX-K

◆

FF (Fine Furnace)
STATEX-B

◆

HMF (High Modulus Furnace)
STATEX-93

◆

SRF (Semi-Reinforcing Furnace)
FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers are produced only at the request of the consumers with 20 bales of the original run set aside for distribution to other interested companies for their evaluation. Such rubber is available in quantities of one or two bales upon request to the Sales Division of Rubber Reserve within six months after the experimental polymer was produced. Subsequent production runs are made if sufficient requests are received to warrant it.

X Number	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*	*Special Characteristics*
X-412 GRS	Goodrich, Port Neches	10-3-47	GR-S-10	To be used as standard reference bale starting January 1, 1948.
X-413 GR-S	General, Baytown	about 11-17-47	GR-S Black-1 stabilized with 1.5 parts Stalite.	Relatively non-staining type GR-S latex masterbatch containing 50 parts EPC Black. Discoloration would not be a factor in a black masterbatch.
X-414 GR-S	Firestone, Akron	11-28-47	Standard GR-S at 90 to 110 Mooney viscosity. Product heat softened in drier to 35 to 50 Mooney viscosity.	
X-415-AC GR-S	Firestone, Lake Charles	11-12-47	71-29 butadiene-styrene charge ratio polymer, fatty acid soap emulsification and modified with tertiary C-16 Mercaptan at 25 to 35 Mooney, stabilized with 1.5 parts Stalite and Alum coagulated.	Low Mooney polymer made to reduce or eliminate breakdown time before compounding. Of immediate interest to chemically blown sponge producers.
X-416 GR-S	U. S. Rubber, Borger	11-3-47	X-344 GR-S latex made by continuous polymerization. Stabilized with 1.5 parts IBUL.	A non-staining and non-discoloring, crosslinked GR-S of the GR-S-60 type. X-416 will have similar excellent processing properties as judged by extrusions, molding and calendering as associated with GR-S-60 and X-344.
X-417 GR-S	U. S. Rubber, Naugatuck	11-14-47	55-45 butadiene-styrene charge ratio, emulsified with mixed rosin soaps (X-358 latex), stabilized with 0.75 parts Stalite and coagulated with Salt and Acid. No Mooney specified although should be within range of 50 to 75.	
X-418 GR-S	Goodyear, Torrence	11-5-47	Standard GR-S	To be used as standard reference bale starting January 1, 1948.

Issue New Production Booklets

The American Management Association, 330 West 42nd St., New York 18, N. Y., has issued several new booklets in its "Production Series" in recent months. Titles of these new booklets, with the price indicated in parantheses, are: "Management Techniques for Increasing Labor Productivity" (75c); "Production Policies for Increased Output" (75c); "The Human Aspects of Methods Improvement" ($1.00). Copies can be secured direct from the Association.

U.S. Transfers Shoe Department

The Shoe Products sales department of the U. S. Rubber Co. has been transferred from New York to the company's plant in Providence, R. I. According to A. C. Grimley, sales manager of the department, the move will permit more efficient coordination of production with distribution. Chief products of the department are rubber heels and soles, fibre midsoling and innersoling, and shoe cements.

Offer Bulletin on GR-S-25

A new technical bulletin on "GR-S-25 and Similar Special Purpose Synthetic Rubbers" has been made available by the Office of Rubber Reserve, Washington 25, D. C. GR-S-25 is a copolymer of butadiene and styrene manufactured in a manner similar to Standard GR-S with the exception that it is protected with a non-staining and non-discoloring type stabilizer, namely, EFED. Copies of the bulletin may be secured on request to the Office of Rubber Reserve.

Propose 25-Year Club

The Twenty-Fifth Anniversary of the Division of Rubber Chemistry, A.C.S., will be observed during the coming year. In recognition of this fact, it has been proposed that a 25-Year Club be established. A committee has been named to formulate plans for such a club. Members of the committee are Dr. H. A. Winkelmann (Dryden Rubber), chairman, W. W. Vogt (Goodyear), and Simon Collier (Johns-Manville).

Completes Creaming Plant

Completion of a new creaming plant for latex at Rengam, Johore, in the Malayan Union, has been announced by the Goodyear Tire & Rubber Co. Production is already under way at the new plant, with John J. Riedl, a chemical engineer, in charge of operations. A separate unit, comprising a bulk storage plant and shiploading facilities, has also been installed in Singapore. Richard C. Arnold is now resident director of Goodyear's operations in Malaya, with headquarters at Singapore. Claude E. Titus is assistant director.

Bloomingdale Suffers Fire

A fire which raged through tons of scrap rubber was recently suffered by the Bloomingdale Rubber Co., manufacturers of reclaimed rubber at Chester, Penna. The fire started from an overheated barrel of oil, but was rather quickly brought under control. Despite reports to the contrary, the plant is still operating and the reclaiming facilities are unimpaired.

21st CHEMICAL EXPOSITION ATTRACTS 50,000 VISITORS

Visitors, estimated to number more than 50,000, from every state in the country and many from foreign countries, attended the 21st Exposition of Chemical Industries, held at the Grand Central Palace in New York City from December 1 to 6. Strong evidence of a rapid industrial growth reaching several years ahead was reported by exhibitors on the basis of a heavy volume of orders, inquiries and requests for information.

More than 375 exhibitors displayed their products, ranging from chemicals in research quantities to equipment for packaging and materials handling. A feature of the exposition was the exhibit of the American Chemical Society which told the story of the society's publications by tracing the evolution of two modern developments of the chemical industry—fluorine chemistry and the silicones—through their pages. The present state of development of these materials was indicated by actual samples in the booth.

Prominent among rubber chemicals at the show were the thiuram disulfide and metal dialkyl dithiocarbamate accelerators currently being featured by Sharples Chemicals, Inc., and the alkylated phenols of the Koppers Co. The latter are finding application as antioxidants and in rubber reclaiming. Plasticizers for the vinyl resins were very much in evidence, including a new group of lead compounds shown by the National Lead Co. and another new group by Evans Chemetics, Inc. The latter are the tributyl and the ethylhexyl esters of carboxymethylmercaptosuccinic acid.

Materials and Equipment Shown

In the materials field, the U. S. Stoneware Corp. displayed its various forms of Tygoflex for lining tanks, drums, pipe fittings, etc., as well as molded pieces of Duralon resins and Fiberglas-reinforced Durisite tanks for high temperature operation. The Johns-Manville Co showed its new line of diatomaceous earth catalyst carriers, which now includes extruded pellets. Numerous plastics were also on display.

Equipment exhibits were very much in evidence. These included the new dust collecting device recently introduced by the Pulverizing Machinery Co., which utilizes wool felt as a filtering medium; new type pumps by the Milton Roy Co.; colloid mills by Eppenbach, Inc.; drying equipment designed to cut down losses in processing powdery materials through better control of temperature, air velocity and material flow, by the Bartlett & Snow Co.; and improved filters of the sealed disc type by the Alsop Engineering Corp.

Among displays of instruments were the new 1500 Alnor pyrometer shown by the Illinois Testing Laboratories; a sensitive electric hygrometer displayed by the American Instrument Co.; probe type temperature controllers exhibited by the Burling Instrument Co.; a new flow rate indicator capable of measuring minute flow rates as low as five millimeters per minute shown by the Fischer & Porter Co.; and an x-ray photometer for the rapid determination of the concentration of one element or compound in the presence of others exhibited by the General Electric Co.

Some rubber products of specific interest to the chemical processing field were also on hand. The Willson Products Co. displayed a new type of rubber goggle made of neoprene which is said to be capable of withstanding considerable mechanical shock. Mine Safety Appliance Co. showed its entire line of safety equipment, including the Chemox oxygen breathing apparatus which differs from others by generating its own oxygen.

Also of interest at the exposition was a new resorcin resin adhesive which is capable of being cured at room temperature, providing durable, waterproof bonds for all cellulose materials, most of the thermosetting and thermoplastic materials, as well as natural and some synthetic rubbers.

All in all, the 21st Exposition of Chemical Industries proved of immense value to both exhibitor and visitor and assures the continuation of these shows. As usual, it was held under the management of the International Exposition Co., of which Charles F. Roth is president. Mr. Roth also acted as manager of the exposition, with E. K. Stevens as associate manager.

Name "Ablest" Chemists

The "ten ablest chemists and chemical engineers" now working in the United States in each of 20 specialized fields were selected in a poll recently conducted by the *Chemical Bulletin*, publication of the Chicago Section of the American Chemical Society. The journal asked its readers, each reader voting in his own field, to name the 10 most outstanding workers. Those selected in the rubber field are listed below in alphabetical order:

J. T. Blake, Simplex Wire and Cable Co., Cambridge, Mass.

R. P. Dinsmore, Goodyear Tire & Rubber Co., Akron, Ohio.

A. R. Kemp, Bell Telephone Laboratories, Murray Hill, N. J.

George Oenslager, formerly associated with the B. F. Goodrich Co., Akron, Ohio, now acting as a consultant.

L. B. Sebrell, Goodyear Tire & Rubber Co., Akron, Ohio.

W. L. Semon, B. F. Goodrich Co., Akron, Ohio.

J. N. Street, Firestone Tire & Rubber Co., Akron, Ohio.

H. L. Trumbull, B. F. Goodrich Co., Akron, Ohio.

G. S. Whitby, University of Akron, Akron, Ohio.

Ira Williams, J. M. Huber Corp., Borger, Texas.

Copies of the 1947 RUBBER RED BOOK are now available. Send your order to RUBBER AGE, 250 West 57th St., New York 19, N. Y. Price: $5.00 per copy.

SECRETARIAT AT LONDON NOW FIRMLY ESTABLISHED

The permanent Secretariat of the International Rubber Study Group, plans for which were formulated at the meeting held in Paris last July, has been firmly established in London. The new Secretariat has taken over the staff and offices of the London Rubber Secretariat at Brettenham House, Lancaster Place, London W.C.2, England.

Countries having accepted membership in the new Secretariat to date include Canada, Ceylon, Czecho-Slovakia, Denmark, France, Hungary, Liberia, the Netherlands, United Kingdom, the British Colonies, and the United States. Membership is open to all countries interested in the production or consumption of rubber.

In general, the functions of the new Secretariat include the following:

(1) To provide the Study Group with a full information service covering both the statistical situation and the general economic position as it relates to rubber.

(2) To provide the necessary link between the member governments in correspondence between meetings of the Group.

(3) To make the necessary preparations in connection with meetings of the Group.

(4) To maintain liaison with other international organizations whose work is especially of interest to the work of the Group.

(5) To make such studies as the Group itself may direct in accordance with provisions contained in its charter.

(6) To issue the Rubber Statistical Bulletin, formerly issued by the London Rubber Secretariat.

Preparing History of Rubber

The Institution of the Rubber Industry has given its complete support to a plan to produce an authoritative book covering the history of the rubber industry. The idea was originally advanced by Fordyce Jones, and in 1946 the Council of the I.R.I. approved of the work being carried through under the joint editorship of Fordyce Jones, T. R. Dawson and Dr. D. F. Twiss. According to present plans the book will cover the following: origin of the industry, raw materials of the industry, scientific and technological development, products of the industry, economic and social history, and a bibliography. The authors invite historical documents or information of any kind. These should be sent to the Institution of the Rubber Industry, 12 Whitehall St., London S.W. 1, England, and will be returned in good condition after perusal.

Article on Vinyl Plasticizers

An interesting review of plasticizers for vinyl compounds appears in the November, 1947, issue of *The Resinous Reporter*, house organ of the Resinous Products & Chemical Co., Washington Square, Philadelphia, Penna. The article covers the use of monomers and polymers, and esters and nitriles, as vinyl modifiers. Copies of the issue may be obtained on direct request to the company.

Scull Named General Manager

William W. Scull

William W. Scull, associated with the B. F. Goodrich Co. since 1929, has been named general manager of manufacturing services of the company. The engineering and factory service divisions, machine and process development department, works technical laboratory, traffic and interplant operations departments are in the group. Mr. Scull has been production manager of plants of B. F. Goodrich Chemical Co., Cleveland, Ohio, for the last two years. A graduate in mechanical engineering from Cornell University, Mr. Scull worked with a company engineering group which erected some of the largest plants in the government's rubber emergency program. He was chairman of the purchasing committee of rubber company representatives responsible for maintaining materials to build and equip the plants. Mr. Scull was named manager of the government plant operated by Goodrich in Akron in 1944, and later was transferred to Louisville, Kentucky, as manager of the government plant there.

ORR To Buy Canadian GR-S

An arrangement has been completed between the Office of Rubber Reserve and the Polymer Corporation, Ltd., under which the American agency will take all of the Canadian plant's exportable surplus of GR-S up to the end of March 31, 1948. The exportable surplus in the period is expected to amount to 6,000,000 pounds for which Rubber Reserve will pay 18½ cents a pound or $1,100,000. Arrangements after March 31 will depend upon the long range rubber plans of the United States. GR-S is sold by Polymer in Canada at 16½ cents a pound.

May Purchase Dryden Rubber

According to report, directors of Poor & Company are considering the early purchase of the Dryden Rubber Co., manufacturers of mechanical rubber goods with plants in Chicago and Springfield, Ill., and Keokuk, Iowa. Poor & Company manufacturers and distributors of railway supplies and equipment.

Rubber Cushions For Apples

The Charles A. Higgins farm, of Kanet Square, Penna., uses soft rubber mats, eight feet square in size, under apple trees to prevent the fruit accidentally knocked down by pickers from being bruised. The sponge-like rubber, developed by the U. S. Rubber Co., is honey-combed with millions of nitrogen-filled cells that "give" under impact and cushion shock.

Seek Casto Reorganization

Glenn L. Casto recently filed a petition in the U. S. District Court at Columbus, Ohio, seeking reorganization of the Casto Co. of Marietta, Ohio, under the Federal Bankruptcy Act. The application listed assets of $1,035,218 and liabilities of $644,-516. There are three Casto companies, the Casto Co. of Marietta, the Casto Co. of Parkersburg, West Va., and the Casto Co. of Spencer, West Va. An application similar to that filed on the Marietta concern has also been filed on the Parkersburg company. William G. Montgomery is receiver for the Marietta and Parkersburg companies, and a separate receiver is in control of the Spencer concern. The Spencer plant was recently reported leased to a Detroit rubber firm.

Ease Latex Restrictions

In an action announced on December 3, the Office of Materials Distribution of the Department of Commerce removed all restrictions on the use of natural rubber latex except in certain sizes of seat cushions. The specifications which restrict the proportion of natural latex used in foam seat cushions of 2½ inches average thickness or less are still in effect. The largest volume of natural latex used by the industry goes into this product and the problem of blending natural and synthetic latex for such purposes has been solved by the industry. Seat cushions 2½ inches thick or less are mainly used in automobiles.

Expands Products Division

General Aniline & Film Corp. has enlarged its special products division, now known as Antara Products, with offices at 444 Madison Avenue, New York, N. Y., to handle sales and distribution of the company's household products and certain chemicals for industrial markets. The new division will continue to expand distribution of synthetic organic detergents, emulsifiers and surface active agents developed in General Aniline & Film's laboratories.

The 1947 RUBBER RED BOOK is now available at $5.00 per copy. Order your copy today from RUBBER AGE, 250 W. 57th St., New York 19, N. Y.

H. C. Bugbee Joins Lockwood

H. C. Bugbee

H. C. Bugbee, recently returned from London where he had been acting as Commodities Attache to the American Embassy for the past three years, has joined Warren S. Lockwood, Foreign Trade Consultant, Washington, D. C. He will also act as co-editor of Lockwood's Monthly Rubber Report. Mr. Bugbee, previous to his London assignment, had been for two years in charge of the sales division of the Rubber Reserve Company, and for the preceding 14 years engaged in rubber procurement for the B. F. Goodrich Co., where he was manager of the Crude Rubber Purchasing Department. He has served as a member of the U. S. delegation to the International Rubber Study Group Conferences in Washington, London, The Hague, and Paris and as an American delegate to the International Tin Study Group Conferences held in London and Brussels.

Heyden Co. Obtains Injunction

A temporary injunction preventing the disclosure of trade secrets and other confidential information concerning formaldehyde and its derivatives has been obtained by the Heyden Chemical Co. against the firm of Burrell and Neidig, Inc., in an order handed down on November 17, in the Court of Chancery of New Jersey. The complaint stated that the company attempted to utilize Heyden's trade secrets to construct for others manufacturing plants for such products. Final hearing on the case has been set for the early part of next year.

Goodrich Arranges Bond Sale

The B. F. Goodrich Co. of Akron, Ohio, announced on November 19 that arrangements have been made for the private sale to an insurance company of $10,000,000 of 2¾% first mortgage bonds, due May 1, 1965. The bonds will be issued as an additional series under the company's existing mortgage. Representing the company in the transaction were Goldman & Co. and Dillon, Read and Co.

DUNLAP, ABBEY AND GORMAN TO HEAD PHILADELPHIA GROUP

Approximately 95 members and guests attended the December 5 meeting of the Philadelphia Rubber Group, held at Kugler's Restaurant, in Philadelphia, Penna. During a short executive meeting held before the regular meeting, the report of the nominating committee was presented and the slate of officers approved. The new officers elected for 1948 are: *Chairman*, W. B. Dunlap, Jr. (Lee Rubber); *Vice-Chairman*, W. F. Abbey (Firestone); *Secretary-Treasurer*, T. J. Gorman (Quaker Rubber).

Directors elected for three years are G. Wyrough (Philips Petroleum) and F. H. Perrine (Thiokol Corp.). Directors with unexpired terms are: F. M. Galloway (Quaker Rubber) and E. H. Grafton (West Co.). Directors appointed to fill unexpired terms are: R. Kurtz (DuPont) and C. Hellyer (H. N. Richards Co.).

During the regular meeting period, F. W. Sands of the U. S. Rubber Co. addressed the group on "The Rubber Chemist and Health Protection." Mr. Sands noted that the rubber chemist plays an important part in the protection of both worker health and public health, and emphasized the following points wherein the rubber chemist can continue to guard industrial and public health:

(1) Vigilance over chemical raw materials used in the factory; (2) Alertness for chemical and other health hazards in the factory; (3) Assistance in the continuance of adequate labeling of chemicals both for use by the consumer and also for use within the plant; and (4) Awareness of the necessity for research in the field of product toxicology and the need for studying the physiological effects of chemicals used in the plant.

Electro-Vapor Pilot Plant

A 15-gallon electro-vapor pilot plant for use by manufacturers of resins, plastics, paints, varnishes and allied products, as well as by general chemical producers, has been developed by the Blaw-Knox Co., Pittsburgh, Penna. The pilot plant is regarded as appropriate for production development as well as for laboratory investigation. Included in the pilot plant are a 15-gallon kettle, vapor pipe, reflux and take-off condenser, condensate piping, condensate decanter, condensate receiver, steam jet ejector, and auxiliary equipment including instrumentation. Any steam pressure up to 150 p.s.i. can be used.

Boston Schedules 1948 Meetings

The Boston Rubber Group has announced that it will hold three meetings in 1948, in addition to a Summer Outing. The meetings, all at the Somerset Hotel in Boston, will be held on the following dates: *Spring Meeting*, March 17; *Fall Meeting*, September 24; *Winter and Christmas Meeting*, December 17. A date for the outing will be announced later. B. H. Capen, of the Tyer Rubber Co., Andover, Mass., is secretary of the group.

Rubber Aids Tube Research

A "make believe" model that tests in a single day electronic tube designs which otherwise require three months to try out is aiding Westinghouse research engineers to develop new, more powerful tubes for television, radio and radar.

It consists of a very thin sheet of rubber stretched across a frame about the size of a small dining room table. BB-shot-

sized bronze balls simulate electrons; hills and valleys in the rubber simulate electrical voltage; and wooden blocks act as tube elements.

Proper arrangement of the hills and valleys direct a ball and controls its velocity. Measuring the time it takes for the ball to roll from one part of the table to another, enables engineers to calculate the speed of actual electrons in a tube. This determines the electrical voltage needed for the particular part of the tube.

To find the proper spacing and optimum shape of tube elements wooden reproductions of various shapes and sizes of cathodes, grids or anodes are used. They help research men to find the arrangement that gives the best focusing of electrons.

The model, which can produce approximate replicas of most kinds of tubes, permits checking the internal design of a tube in one day compared to three months by the old mathematical trial and error method. Moreover, checking minor design changes in an electrode which used to require a whole day, can now be done in five minutes.

Reconditioning Banbury Mixers

The development of an improved method for reconditioning Banbury mixers has been announced by the Welding Methods Corporation, Dayton, Ohio. Based on a so-called revolutionary electro-welding technique, which is the subject of patent application, the new method is said to provide a hardened facing on the working surfaces of the rotors and rotor cavities. The application of a newly-developed dust ring assembly is also said to materially reduce wear and substantially eliminate leakage. Several Banburys reconditioned by the new method are reported to be now in use, giving satisfactory service and a minimum of wear.

CHICAGO GROUP HEARS SAYRE ON MANAGERIAL CONTROL TOOLS

Approximately 123 members and guests attended the November 21 meeting of the Chicago Rubber Group at the Morrison Hotel in Chicago, Illinois. Principal speaker of the evening was Benedict M. Sayre, president of the company bearing his name, who spoke on, "Managerial Tools For Profit."

Mr. Sayre stressed the importance of good bookkeeping in industry, particularly in determining the true costs of manufactured products. The determination of cost figures based on averages of direct and indirect costs over a period of time are usually misleading and do not present the proper picture to management, he said. Costs based on a variable basis where the indirect costs are broken down into time costs and variable costs are more reliable as to accuracy.

R. L. Stapleton and L. M. Glasner, of the Chicago Technical Societies Council, outlined the function of the council, and extended an invitation to the group to participate in the March, 1948, Chicago Technical Conference, an annual project. A committee under Dr. H. A. Winkelmann is studying the proposal of sponsoring a panel session at this conference.

The meeting adjourned after viewiig motion pictures showing the highlights of football games played by the Chicago Bears and the Chicago Cardinals during the 1946 season.

Rhode Island Hears Cadwell

The Rhode Island Rubber Group held its Fall Meeting on November 13 at the Crown Hotel, Providence, R. I. The meeting was addressed by Dr. S. M. Cadwell, director of research and technical development of the U. S. Rubber Co., who spoke on "Tires of the Future." Dr. Cadwell said that "if the public, since 1920, had paid 1920 prices for 1920 quality tires, it would have cost them over 40 billion dollars more than they actually spent." The rubber industry has contributed, through science, an amount equal to the national debt before the war, he stated. "It is by contributions like this that the present huge national debts are going to be paid," he claimed. Dr. Cadwell also pointed out that World War II gave industry experience in building tires adapted to transporting armies over open country As a result, he expects a great post-war development of rubber-tired vehicles on the farm, contributing to a surge in rural mechanization.

Quebec Group Hears Cliffe

The Quebec Rubber and Plastics Group held its second meeting of the current season on November 13, at the Ritz-Carlton Hotel in Montreal, Canada. Guest speaker for the evening was Dr. Albert E. Cliffe, noted scientist and chemist, who spoke on "The Wicks of Life." His talk cited the important role vitamins play in the everyday life of the individual. Dr. Cliffe told the Group members that vitamin deficiency can have a most insidious effect on the individual disposition.

NORTHERN CALIFORNIA GROUP HEARS TALK BY MANSFIELD

Harold Mansfield, president of the Pioneer Rubber Mills of Pittsburg, Calif., whose experience in the rubber manufacturing field covers a span of some forty years, was the principal speaker at the regular meeting of the Northern California Rubber Group held on November 20. Approximately 60 members and guests were in attendance.

Mr. Mansfield's remarks were purely extemporaneous and were very interesting to his audience. He traced the history of the rubber manufacturing industry on the Pacific Coast, from the time of the San Francisco earthquake up to the present, emphasizing the tremendous strides made possible by developments contributed by the rubber technologist. He named numerous rubber and rubber-like products now commercially available as a result of such development and paid tribute to the chemists who made them possible.

At the conclusion of Mr. Mansfield's remarks, additional references to the history of the western rubber industry were contributed by John B. Watson, president of the Goodyear Rubber Co. of San Francisco; Griff Oliver, president of the Oliver Tire & Rubber Co.; W. D. Good, chief chemist of the American Rubber Mfg. Co.; Eugene Foubert, compounder of the Plant Rubber & Asbestos Works, and Emmett Reinbold, chief chemist of the Pacific Rubber Co. It was discovered that the audience included three men who had been in the rubber business for over 35 years, seven for over 30 years, and fifteen for over 25 years.

At the conclusion of the meeting, a beautiful automobile robe donated by the Shell Oil Co. was won by Lyn Shafer (American Rubber Mfg.). The meeting was termed a complete success.

Hatsch Addresses Ontario Group

R. E. Hatsch, Manager, Sales and Technical Service Division, Polymer Corporation, was the principal speaker at the meeting of the Ontario Rubber Section of the Chemical Institute of Canada held at the University of Toronto, Canada, on December 9. Recently returned from an extended tour of rubber factories throughout Europe, Mr. Hatsch stated that his tour convinced him that the various types of synthetic rubber made at Sarnia will continue to have an important place in continental European production. Were it not for the dollar shortage, he said, European processors would be using much more man-made rubber than is now the case. Mr. Hatsch also reported that despite the natural feeling of the British for tree-grown rubber, many processors in England are continuing to use some GR-S.

The use of Midco, a whole tire reclaim, and M-461, a peel reclaim, both based on blends of natural rubber and GR-S, as a passenger tire GR-S undertread compound is covered in a special report (Report No. 8) issued by the Midwest Rubber Reclaiming Co., East St. Louis, Ill. Copies of the report are available from the company on request.

Ontario Group Hears Thwaites

Approximately 55 members and guests attended the second meeting of the current season of the Ontario Rubber Group, held on November 14 at McMaster University in Hamilton, Ontario. This was the group's annual out-of-town meeting, as all other meetings are held in Toronto, but in appreciation of the attendance of out-of-towners at the other meetings the group holds one meeting in Hamilton and one in Kitchener in alternate years. The dinner meeting at Hamilton was followed by a talk on "Science and Living" by Joseph Thwaites, chief electronic engineer of the Canadian Westinghouse Co. Mr. Thwaites told of some of his work in connection with radar and electronics during the last war and indicated that on numerous occasions he believed that Divine revelations came to some of the allied scientists, as a number of the most successful pieces of apparatus used in connection with radar work was entirely opposed to the ordinary laws of science.

Offer Unique Demonstration

The Wooster Rubber Co., Wooster, Ohio, manufacturers of rubber household goods, is currently promoting the sale of its products through unique demonstrations held at department stores in various parts of the country. In the demonstration, consumers actually witness the manufacture of plate and bowl scrapers and see miniature samples of other rubber housewares withstand a "chemical beating" in a pint-size laboratory. A small mold turns out bowl scrapers at the rate of one every six minutes. The complete manufacturing cycle—molding, trimming and assembly—is performed. The initial demonstration was held at Sibley, Lindsay & Curr, Rochester, N. Y., department store.

RUBBER EQUIPMENT DISCUSSED AT CONNECTICUT GROUP MEETING

The Fall meeting of the Connecticut Rubber Group was held on November 14 at General Electric Co.'s Monogram Hall, in Bridegport, Conn. Edward S. Thompson and Donald Chase, both of the Farrel-Birmingham Co., Ansonia, Conn., spoke on "Recent Developments in Rubber and Plastics Machinery."

Mr. Thompson discussed the principles behind the design of various types of rubber equipment, while Mr. Chase outlined the manner in which newly designed equipment was used. Both speakers stressed the fact that lowered costs and increased production were made possible by the use of new equipment. A movie short, "The Mill Room of the Future," was shown in conjunction with the discussions.

At a business meeting following the talks, the treasurer reported that the Group finances were in a healthy state. The newly elected officers were introduced to the assembled members and guests. These are: *Chairman,* Raymond H. Dudley (Whitney Blake); *Vice-Chairman,* Stuart M. Boyd (U. S. Rubber, Naugutuck); *Secretary,* Donald F. Spengler (Sponge Rubber Products); *Treasurer,* Carl Larson (Whitney Blake).

The evening was concluded with the showing of a film on a rubber process with the compliments of the U. S. Rubber Footwear Division.

Falk Corporation, Milwaukee 8, Wisc., has released its new Bulletin 10,000. This bulletin, which has received national recognition for the company in a nationwide competition for industrial sales literature, describes and illustrates all Fall precision products, including gears, speed reducers, couplings, speed drives, etc.

Candid photograph taken at the November 20th meeting of the Northern California Rubber Group. From left to right: Bob Henderson, purchasing agent, American Rubber Mfg. Co.; R. E. Burke, president, Burke Rubber Co.; Lyn Shafer, general manager, American Rubber Mfg. Co.; George Farwell, sales manager, Goodyear Rubber Co. and president of the Group; Harold Mansfield, president, Pioneer Rubber Mills, the principal speaker at the meeting; John B. Watson, president, Goodyear Rubber Co., and Griff Oliver, president, Oliver Tire & Rubber Co.

NAMES IN THE NEWS

J. E. Rutter, associated with the U. S. Rubber Co. for the past 27 years, has been appointed sales development manager of the Lastex Yarn and Rubber Thread Division of the company.

B. J. C. van der Hoeven, Chief of the Chemical Engineering Department, Engineering and Construction Division of the Koppers Co., Pittsburgh, Penna., has been named assistant general manager of the division.

T. Norman Wilcox, development engineer in the Methods and Equipment Laboratory of the Plastics Division of the General Electric Co. at Pittsfield, Mass., has been appointed manager of the laboratory.

Hubert A. White, a member of the development department of the Goodyear Tire & Rubber Co. at Akron since 1945, has been appointed chief chemist at the company's tire and mechanical goods plant in Sydney, Australia.

William I. Burt, Vice-president of the B. F. Goodrich Chemical Co., has been elected a director of the American Institute of Chemical Engineers.

C. V. MacKay, formerly assistant to the president of the Triangle Conduit & Cable Co., Inc., New Brunswick, N. J., has been elected a vice-president of the company.

M. G. Morgan, who has been laboratory manager at the Miami, Oklahoma, plant of the B. F. Goodrich Co., was recently elevated to the position of production manager at that plant.

W. R. Hucks, who has been associated with the government synthetic rubber program for the past five years, most recently as Deputy Director in charge of the Production Division of the Office of Rubber Reserve, has left government service to return to private industry.

Harold M. Leeper, associated with the Government Rubber Laboratories in Akron for the past few years, is now affiliated with the Wm. Wrigley, Jr., Co., in Chicago, as polymer chemist.

G. F. Roquemore, formerly associated with the Chemical Products Development Division of the Goodyear Tire & Rubber Co., is now with the Casto Co. as assistant plant manager of the Marietta, Ohio, and Parkersburg, W. Va., plants.

Pieter Honig, formerly a Commissioner of the Board for the Netherlands Indies, Surinam and Curacao, with headquarters in New York, is now Commissioner of the Netherlands East Indies Institute for Rubber Research in Batavia, Java.

A. H. Flower, director of research of the Inland Manufacturing Division of the General Motors Corp., Dayton, Ohio, for many years, recently retired.

Brittain Named Hinshaw Assistant

H. A. Brittain, general superintendent of the Goodyear Tire & Rubber Co. plant in Wolverhampton, England, since 1939, has been transferred to Akron where he will be an assistant to George K. Hinshaw, production manager of Goodyear foreign operations. Born in Brantford, Canada, Mr. Brittain joined Goodyear as a machine designer in 1918. Prior to going to England in 1936 in charge of the technical division at Wolverhampton, he was in charge of passenger and bicycle tire design in Akron.

Issue Consultants Directory

The Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st St., New York 17, N. Y., has issued the eleventh edition of its Classified Directory. The new edition, which is amended and enlarged and comprises 120 pages, is divided into three sections, the first containing key sheets, the second scope sheets, and the third being an index of members, services offered and geographical location. Copies are available without cost on request to the Association.

Revive Journal Communications

The Rubber Research Institute of Malaya, which maintains its headquarters at Kuala Lumpur, Federated Malay States, has revived its Journal Communications, issued under the title of the *Journal of the Rubber Research Institute of Malaya*. The first communication to be published since the Institute resumed activities on liberation from Japanese occupation in September, 1945, is dated August, 1947, and was issued as Volume 12, No. 262. It contains a report by G. Owen on "Retention of Phosphates by Malayan Soils."

1947 Motor Truck Facts

The Automobile Manufacturers Association, Detroit, Mich., has issued the 1947 edition of its "Motor Truck Facts." This is the first issue of this compilation since the end of the war and the seventh edition published since 1927. Data contained in the booklet includes that pertaining to production, registrations, taxes, employments, use of trucks, age of trucks, farm trucks and highway standards. Copies can be secured on request from the Association.

Youse Succeeds John Krauss

L. K. Youse

Lawrence K. Youse, formerly technical superintendent of the V-belt plant and recently assistant manager of the L. H. Gilmer Division of the U. S. Rubber Co. at Tacony, Penna., has been named manager of that division, succeeding John S. Krauss who has retired. Mr. Krauss, a pioneer developer of the V-belt industry, started his career in 1912 as an assistant to L. H. Gilmer. At a luncheon in his honor, Gilmer employees presented Mr. Krauss with a television set as a token of their good wishes. Although he will no longer take an active part in management, he will be available for consultation.

Air Lock Safety Tube

Pennsylvania Rubber Co. of Jeannette, Penna., has announced the development of a compression safety tube which is claimed to be the foremost improvement in the passenger tire tube field in many years. Patented under the name of "Air Lock Safety Tube," the tube was introduced at a private showing during the recent national convention of the National Independent Tire Dealers Association at Cleveland. In describing the tube as the compression type, the company explains that if a puncture occurs, the squeeze action of the "Air Lock Safety Tube" forces the rubber pores tightly together, causing the rubber to grip tightly around the puncturing object. Full scale production of this new safety tube has already begun.

A combination sander and polisher, made of flexible rubber, has been introduced by the Detro Manufacturing & Sales Co., Los Angeles 12, Calif. The combination unit is said to be able to follow all surface contours.

A reprint of the article, "Vulcanization of Rubber with Sulfur," by Ira Williams of the J. M. Huber Corporation, Borger, Texas, has been made available by the company.

Continue Record Tire Output

Tire production continued at a record breaking pace through September with 57,420,758 passenger casings and 13,472,991 truck and bus casings rolling off production lines in the first nine months of this year, according to the latest report of the Rubber Manufacturers Association. During the month of September, shipments of passenger casings totaled 6,724,620 units, an increase of 8.91% over August, while production amounted to 6,495,900 units, an increase of 11.61% over the previous month. Manufacturers' inventories of passenger casings were down 5.10% to 3,705,594. Production of truck and bus casings during September totaled 1,422,751, up 5.82% over August, while shipments increased 13.03% to 1,520,985, causing an inventory reduction of 4.76% to 1,485,236 units. Shipments of passenger car casings during the first nine months of 1947 totaled 55,353,233 units, an increase of 18.25% over the 1946 figure of 46,809,241. The increase in shipments was largely accounted for by the doubling of units shipped for original equipment purposes in 1947 as compared with 1946.

Changes in U. S. Tire Division

The Tire Division of the U. S. Rubber Co. has announced the appointment of Curtis L. Moody as factory manager of the company's Detroit plant. In addition to his new duties, Mr. Moody will continue as assistant production manager of the tire division. Harold Weigold, who has been assistant factory manager of the company's plant in Eau Claire, Wis., has been appointed assistant factory manager of the Detroit plant. Clayton L. Remy and Robert E. Lundgren have been transferred from Detroit to Eau Claire. Mr. Remy will be production superintendent of the Eau Claire plant and Mr. Lundgren, plant engineer. Forbes Williams was named manager of product control, tire division, with headquarters in Detroit. Changes in the Detroit plant organization were the appointment of Frank L. Swanson as plant engineer; George F. Wikle, process engineer; C. A. Neville, manager, product control; and Daniel E. Durst, general superintendent of tire production.

Rubber Consumption at New High

Rubber consumption climbed 6.96%, from 86,290 long tons in August to 92,299 in September, to set a new nine months high for the manufacturing industry. Consumption for the first three quarters stood at 828,569 long tons of new rubber. This was 10.42% above the record 750,390 long tons used in the same period last year. At the same time consumption of reclaimed rubber advanced 6.13% over 1946 to 213,018 tons for the nine-month period. In its monthly estimate of consumption, the Rubber Manufacturers Association noted that the use of synthetic rubber was in excess of natural rubber consumption for the nine month period. Synthetic rubber use totalled 431,589 long tons, as against 396,980 long tons for natural.

Edwards Joins Acushnet Co.

Thomas C. Edwards

Thomas C. Edwards, who recently resigned as manager of technical service and sales in New England for the Enjay Co., Inc., has joined the Acushnet Process Co. of New Bedford, Mass., as technical director. Previously, Mr. Edwards had served in the research department and the compounding laboratories of the B. F. Goodrich Co. for ten years, and for several years was associated with the Davidson Rubber Co. Mr. Edwards is a graduate in chemical engineering of Ohio Northern University.

Film Story of Liberia

A new sound motion picture entitled "Liberia—Africa's Only Republic," made by the Firestone Tire & Rubber Co., received its premiere in Washington, D. C., on November 24. The film, which portray's the tremendous strides the "Dark Continent" is making, was also shown to a group of business editors and industrialists in New York City on December 10. Also depicted is the growth of the Firestone plantations in Liberia, from the clearing of the jungle to the shipping of the rubber. Appropriately the film and a book, "Liberia," by Charles Morrow Wilson, make their debut on the 100th anniversary of Liberia.

Article on Huber Division

An article outlining the functions and personnel of the Industrial Products Division of the J. M. Huber Corporation is contained in the November, 1947, issue of the *Huber News*, the corporation's house organ. The Industrial Products Division, which has long been under the supervision of R. H. Eagles, handles the corporation's sales of carbon black and clay.

The 1947 RUBBER RED BOOK is now available. Price: $5.00 per copy.

Correspondence Course on Rubber

The Canadian Institute of Science & Technology, Ltd., 219 Bay St., Toronto 1, Canada, is currently offering a number of interesting correspondence courses covering numerous industries, including rubber and plastics. The course on rubber, which covers both natural and synthetic rubber is offered at a reasonable fee, treats with the technological aspects and reflects the latest trends in the employment of the material. A pre-requisite of the course is the study of mathematics, heat and light, physical chemistry, and the principles of organic chemistry. The main section is devoted to rubber itself, including processing, vulcanization, compounding ingredients, development of compounds, adhesion of rubber to metal and other materials, synthetic rubber development, classification of synthetics, compounding of synthetics, organization and control of plant and processing. A booklet called "Engineering Opportunities," which outlines the various courses offered, is available from the Institute on request.

Diatomaceous Earth Plant

A new plant designed to process diatomaceous earth to exacting, individual product specifications for the rubber industry has recently been completed by the Eagle-Picher Co., of Cincinnati, Ohio. Located at Clark, Nevada, the plant is already producing "Celaton," the company's trade-name for its diatomaceous earth, which is an efficient filler for both natural and synthetic rubber. Advantages claimed for the new product include light weight, high bulk, good color, heat resistance, flexibility and elasticity. Eagle-Picher emphasizes the fact that the nature of the processing equipment at the new plant will enable it to produce "Celaton" to any specification required to a degree unattainable in less modern plants.

Papers on Low Pressure Tires

Two papers on extra low pressure tires will feature the Passenger Car Session of the Annual Meeting of the Society of Automotive Engineers to be held at the Book-Cadillac Hotel in Detroit, Mich., January 12 through 16. The Passenger Car Session will be held on Wednesday morning, January 14. The two papers are both entitled "Extra Low Pressure Tires for Passenger Cars," and will be presented, respectively, by W. E. Shively of the Goodyear Tire & Rubber Co., Akron, Ohio, and G. H. Parker and E. Shay of the Chrysler Corp., Detroit, Mich.

Seiberling Opens Laboratory

A sales and service laboratory designed to coordinate research for independent tire dealers, said to be the first of its kind, was officially opened in Akron on November 20 by the Seiberling Rubber Co. The new laboratory contains a model store, dealer school, repair shops and other dealer services. Research on new tire repair and recapping materials will be conducted at the laboratory, which will also conduct road tests on experimentally built tires.

OBITUARIES

John H. Coulahan

John H. Coulahan, who was associated with the rubber manufacturing industry from 1909 until his retirement in 1933, died recently at the age of 71. Funeral services were held on September 15 in Concord, N. H., with interment in Pembroke Hill Cemetery, Pembroke, N. H. Born in Boston, Mass., on August 17, 1876, Mr. Coulahan received his education at local schools and attended Harvard College. He entered the rubber field in 1909 with the Boston Woven Hose & Rubber Co., serving as production manager. In 1912 he joined the Mechanical Rubber Co. of Cleveland, a unit of the U. S. Rubber Co., acting as both production manager and executive assistant to the factory manager. At the end of World War I he was transferred to U. S. Rubber's footwear division at New Haven, again serving in a production capacity. In 1923 he joined the Stedman Rubber Flooring Co. as purchasing agent, remaining with that concern until his retirement in 1933. A widow, son and daughter survive.

Howard F. Parkerton, Sr.

Howard F. Parkerton, Sr., manager of the Farrel-Birmingham Co., Inc., sales office at Los Angeles, California, died following an operation on October 27, at the age of 62 years. Mr. Parkerton was born in Redding, Connecticut, and first came to the Farrel firm at Ansonia, Conn., in 1901 where he served his aprenticeship as a machinist. Later, in 1920, he was employed at the company's Buffalo, New York, plant, and in 1930 was placed in charge of a newly established sales office in Los Angeles, which remained under his management until his death. Mr. Parkerton also supervised the installation of many propulsion gear units in vessels built at West Coast yards during World War II. He is survived by his wife and a son, Howard, Jr., who has for several years been associated with his father in the Farrel-Birmingham Los Angeles office.

Sylvanus M. Wolfe

Sylvanus M. Wolfe, pioneer tire manufacturer and former proprietor of the Newark Tire & Rubber Co., died of a heart attack on November 7, at Newark, Ohio. He was 63 years old. Mr. Wolfe was born in Massillon, Ohio, and had been a resident of Newark for 35 years. He was a long-time member of the Newark Board of Education, and was a member of the Masons. Mr. Wolfe also served on the Board of Trustees of the Plymouth Congregational Church in Newark. Funeral services were held on November 10 with burial in Cedar Hill cemetery. He leaves a widow and son.

Ralph V. Kline

Ralph V. Kline, founder and president of Morenci Rubber Products, Inc., died at his home in Morenci, Michigan, on November 23 after an illness of five months. He was 55 years old. Mr. Kline, a native of Akron, Ohio, worked most of his life in the rubber industry, being associated in Buffalo, New York, with the U. S. Rubber Reclaiming Co., Hewitt Rubber Co., and the rubber division of the Fowler and Union Co. In 1936 he accepted a position with the Mogul Rubber Corp., in Goshen, Indiana, of which he later became vice-president and general manager. In 1945 he founded the new Morenci Rubber Products, Inc., of which he was president and general manager. Mr. Kline was a member of the Elks and of several Masonic bodies. A widow and daughter survive.

John Hadfield

John Hadfield, owner of the Serugo Rubber Co., Cuyahoga Falls, Ohio, died on November 26, in Akron, Ohio, at the age of 73. A native of England, Mr. Hadfield came to this country when he was six years old. He retired recently after heading the rubber company which he founded 20 years ago. Mr. Hadfield was a trustee in the Fifty Year Club and a member of the Akron Universalist Church. Services were conducted on November 30 in Cuyahoga Falls, with burial in Oakwood Cemetery. A widow survives.

Robert B. Lewis

Robert B. Lewis, chief engineer of the Tinius Olsen Testing Machine Co., Philadelphia, Penna., for thirty-five years, died on October 24. He was 73 years old. Mr. Lewis held numerous patents relating to physical testing machines and equipment. He was active in many engineering societies, including the Engineers' Club of Philadelphia, A.S.M.E., and A.S.T.M. A graduate of Cornell University, class of 1895, Mr. Lewis was previously employed by the Bethlehem Steel Corporation.

Paul L. Fitzgerald

Paul L. Fitzgerald, New England Division sales manager of the Union Bay State Chemical Co., Cambridge, Mass., died at the Mt. Auburn Hospital, Cambridge, on October 27. Mr. Fitzgerald had been employed since 1936 by the Union Bay State Chemical Co., and was appointed New England Division Manager of the Sales Department in 1945. He is survived by his widow and a son.

Who makes it? The 1947 RUBBER RED BOOK has the answers. Price: $5.00.

Inflatable Vinylite Football

A 10-inch inflatable football, made of Vinylite, is being distributed nationally by W. S. Rainford Products, Inc., of Closter, New Jersey. A feature of the

toy is a new, borderless seam developed by Rainford. The ball, made of 12-gauge Vinylite, is said to be strong enough to bear the weight of an adult man. Another feature of the toy is a soft pliable valve which folds almost flat and tucks into a surface on the ball. This replaces dangerous and easily lost metal plugs. The football is easy to clean and is colored with non-toxic fast dyes that do not run or fade. It is simple to repair if punctured. Other inflatables of the Rainford line include: the Panda, Bipbo the Dog, Santa Claus and Jojo the Kangaroo.

Lightweight Rubber Lung

A lightweight rubber lung that can be carried like a stretcher is the latest device for rendering artificial respiration to victims of infantile paralysis, drowning, electric shock and poisoning, according to the U. S. Rubber Co. The new lung is built around a large rubber bellows which replaces a heavy steel tank used to enclose patients in iron lungs. An electric pump forces air in and out, simulating breathing. The bellows, developed by the U. S. Rubber and the Iron Lung Co. of America, is made by a new process used during the war to produce flexible non-metallic tubing for airplanes. The respirator can be transported easily to the scene of an accident by truck, ambulance or airplane. When not in use it can be folded up for storage in a small space.

New Leather-Rubber Sole

The Auburn Rubber Company of Auburn, Indiana, has placed a combination leather-synthetic rubber sole upon the market. The product will be known as "Dubl-Sole," and is so designed that the leather portions of the sole are next to the foot, while the synthetic rubber portions are nearest the ground. This arrangement permits the wearer to utilize the non-skid and waterproof qualities of the synthetic rubber, while maintaining the comfort of leather next to the foot.

It was written for you... So write for it

A new booklet, "Witco Pigments in Rubber," has recently been prepared and released by the Witco Technical Service Laboratory.

It was written for you . . . and we believe that the general and specific technical information it contains will prove useful.

The physical properties of some of the most important Witco pigments and their behavior in various natural rubber stocks and blends of natural rubber and GR-S are detailed in this booklet . . . with test data, graphs and bar charts.

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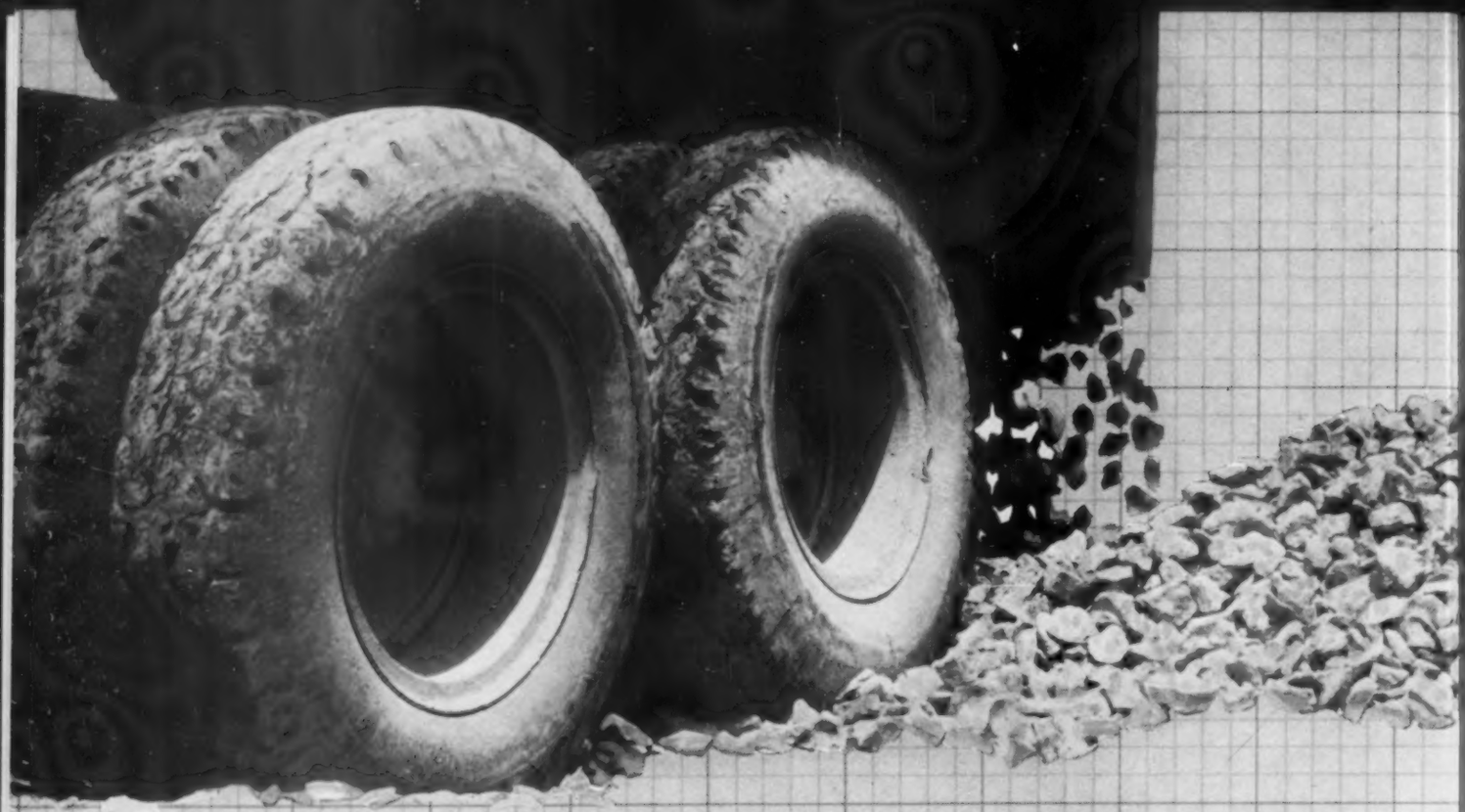

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CONTINENTAL F . . . hard processing channel black with average particle diameter of 20 to 25 m mu. Available either compressed or in pelletized form.

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ASME to Publish New Monthly

The first issue of *Applied Mechanics Reviews*, a new monthly engineering and scientific journal devoted to reviewing current world-wide literature in the field of applied mechanics, will appear in January, 1948, the American Society of Mechanical Engineers has announced. Co-sponsors are the ASME, the Engineering Foundation, the Illinois Institute of Technology and other organizations. Dr. L. H. Donnell, research professor of mechanics at the Illinois Institute of Technology, Chicago, has been appointed editor-in-chief. Dr. S. P. Timoshenko, of Palo Alto, California, professor emeritus of Stanford University, will be editorial adviser. The editorial policy will be under the general supervision of a committee representing the ASME, the Office of Naval Research, the American Institute of Physics, the American Society of Civil Engineers, and the Society for Experimental Stress Analysis, as well as the Institution of Mechanical Engineers of Great Britain and the Engineering Institute of Canada.

Data on Calcium Silicate

In recent months the Columbia Chemical Division of the Pittsburgh Plate Glass Co., Fifth at Bellefield, Pittsburgh 13, Penna., has made available a number of interesting technical reports on Silene EF, its hydrated calcium silicate. Reviews of some of these reports have appeared in this journal. A number of additional reports have since been issued, under the following titles: (1) Effect of Ethylene Glycol on Silene EF and Natural Rubber Compositions; (2) General Compounding Data on Silene EF and GR-S Formulations; (3) Data on Silene EF in Natural Rubber; (4) Highly Loaded Silene EF Stocks; (5) Comparison of Mixtures of Calcene T and Silene EF with Other Fine Calcium Carbonates in GR-S at Medium and High Loadings. Copies of any of these reports may be secured on direct request to Columbia Chemical.

URWA To Press Wage Rises

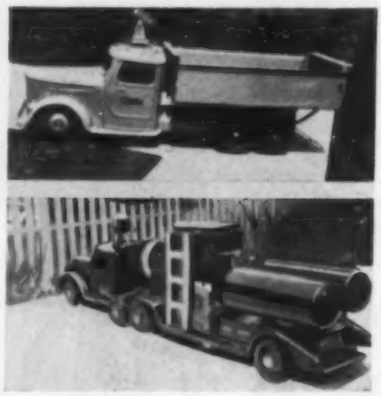
According to a statement by H. R. Lloyd, vice-president of the United Rubber Workers of America (CIO), that union organization will lead the parade for higher wages if Congress does not pass some legislation controlling prices. Stating that "the cost of living has gone completely off the working man's reach," Mr. Lloyd said that the URWA has no other choice but to press for higher wages if Congress does not take quick action.

Leeds & Northrup Buy Building

Leeds & Northrup Co., manufacturers of electrical measuring instruments, automatic controls and heat-treating furnaces, recently purchased a two-story and basement building at 34 E. Logan St., in Philadelphia, one block from their main plant. The newly acquired property will add approximately 11,000 sq. ft. of floor space to the 288,886 sq. ft. now in use at the main plant. The purchase price was not revealed.

Motorized Toy Metal Trucks

T. A. Werkenthin, principal materials engineer in charge of the rubber and plastics section of the Bureau of Ships, Navy Department, has a hobby which should prove of interest to every rubber chemist



with sons. In his spare time Mr. Werkenthin fits small but powerful electric motors in toy metal trucks. He also makes some with gasoline engines, but these are intended for older children since they present some danger in handling.

Long interested in things electrical, Mr. Werkenthin started his hobby some time ago when small motors were made available as war surplus. To date he has made a number of interesting models. For example, he has made a dump truck (illustrated herewith) with two motors, forward and reverse, single speed, or two forward and two reverse speeds, equipped with a model searchlight. Another model of the dump truck has a single motor and no searchlight. In the fire truck field, he has produced a pump and ladder truck (also illustrated) which has two motors. This unit has water storage tanks and throws a stream of water about 30 to 45 inches from the nozzle.

A major advantage of these motor-driven toy trucks is that unlike toy trains they can be run on concrete, wood, tile or linoleum floors, inside or outdoors. They are driven by dry cells, high voltage (27½ volts) and last a surprisingly long time. Further information on these novelty items can be secured from Mr. Werkenthin, whose home is at 3601 Second St. South, Arlington, Va.

Woodgrip and Gripweld Adhesives

Two new adhesives, destined for use in window trimming and display advertising, have been announced by the Adhesive Products Corp. of New York. These adhesives, known as "Gripweld" and "Woodgrip," make it possible to adhere objects directly to vertical surfaces including walls, mirrors, windows, tile, etc., the manufacturer claims. The adhesives come with either a water or a solvent base. The solvent base adhesive is said to withstand heat, and is completely waterproof.

Where can we get four-roll calenders? The answer is in the 1947 RUBBER RED BOOK.

Booklets on Positex Latex

Several booklets on Positex, the new form of natural rubber latex with reversed charge, which was developed just prior to the war in England, have been made available by the British Rubber Development Board, 19 Fenchurch St., London, E.C. 3, England. The research work reported in these booklets was carried out by the Wool Industries Research Association in collaboration with the Technical Research and Development of New Uses Committee of the Rubber Growers' Association and later with the British Rubber Producers' Research Association. Titles of the booklets issued to date are: (1) Positex; (2) The Compounding, Pigmenting and Thickening of Positex; (3) Positex in the Woolen and Worsted Industries; (4) Positex Applied to Cotton, Linen, Sisal or Jute Yarns and Fabrics; (5) Positex in the Manufacture and Treatment of Felts; (6) Positex as a Textile Printing Paste. Copies of these booklets may be secured without cost by writing to the British Rubber Development Board.

Install Bag Printing Presses

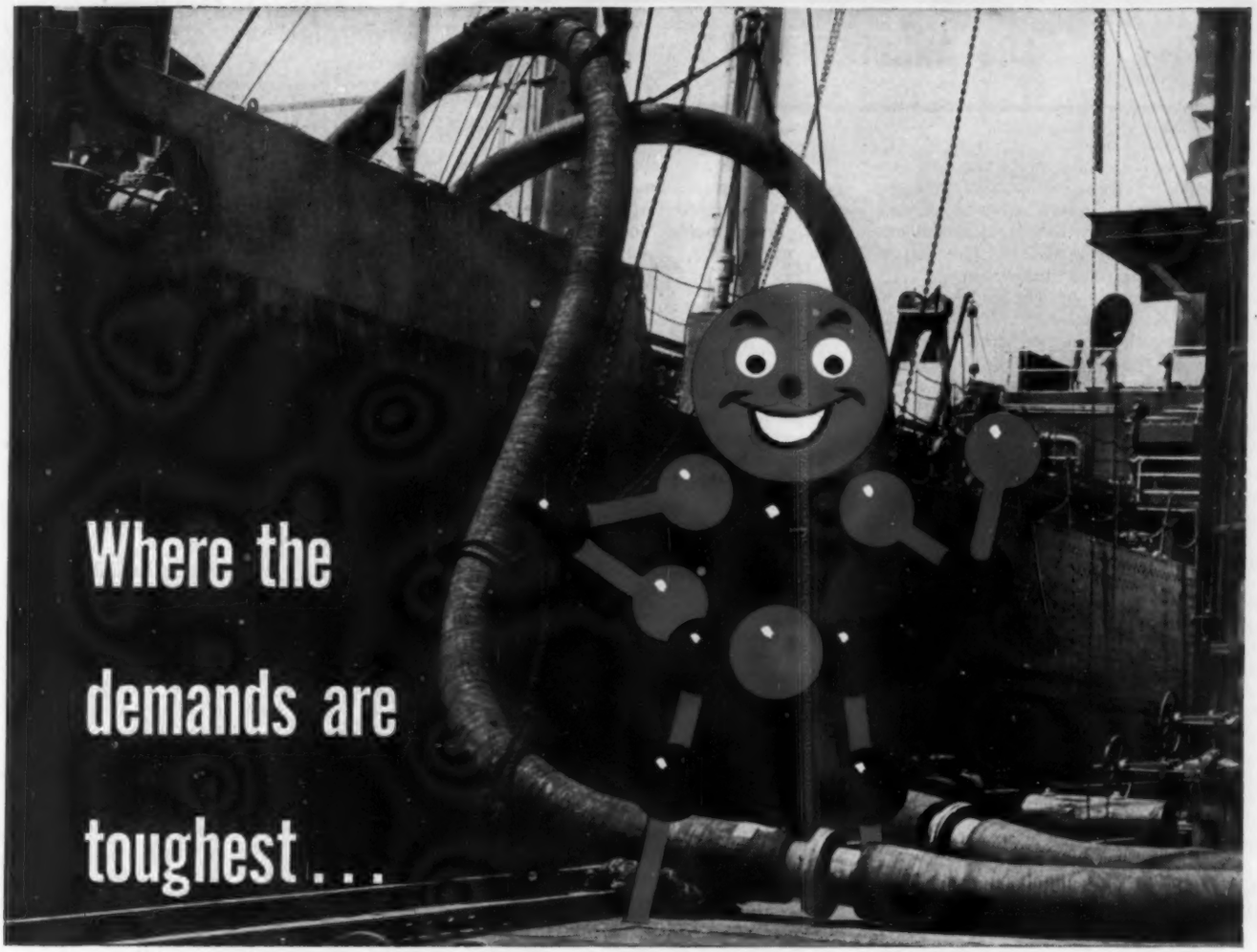
Godfrey L. Cabot, Inc., has completed installation of printing presses in each of its carbon black plants on which individually marked or coded bags are printed, on the spot, for rubber manufacturers using the company's black. Altogether, ten of these presses have been put into operation, and two more are being installed. The printed matter will include brand names and grades, net weight, and possibly more important, the individual code numbers of each company receiving the black. These code numbers will be printed on the face and bottom of each bag, so that no matter how the bags are stacked, mill hands in rubber plants will be able to find instantly the pigment specified in the formula.

Witco Building Asphalt Plant

The Witco Chemical Co. has started construction of an asphalt processing refinery in Perth Amboy, New Jersey. This plant will be in operation by mid-year 1948, company officials stated. Built to take care of Eastern requirements, the plant will produce asphaltic materials to meet exact specifications or requirements including compounding, waterproofing, mastics, fillers, mineral rubbers, battery boxes and sealers, and other miscellaneous special uses, as well as the general run of asphaltic materials for roofing, paving, etc.

Monsanto to Build Plant

Monsanto Chemical Co. has announced plans for the construction at Decatur, Illinois, of a small plant for the manufacture of glues and adhesives. The new plant will take over part of the work the company is now doing at its plant in Portsmouth, Va. Company officials stated that the Decatur project will not begin until some time after January 1, and the plant is not expected to begin operation until after next July 1.



Hewitt chooses Perbunan!

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LOS ANGELES NEWS

The November meeting of the Los Angeles Rubber Group was again preceded with an interesting and informative session of the Technical Group members. W. J. Thomas (Firestone), Chairman of the Technical Group, introduced the evening's speaker, Sidney H. Pinhasik (Latex Seamless Products).

Mr. Pinhasik spoke on "Aqueous Rubber Dispersions." He traced the development of dispersions from its early stages through the improvements that followed. Present-day procedures and equipment used in the manufacture of dispersions were explained, along with the various types of dispersing agents and protective colloids required.

During the war a large part of the dispersions used were made from reclaimed rubber, but now that natural rubber is available again, it has replaced the use of former substitutes. A comparison of the physical properties of a typical crude rubber dispersion with those of a typical reclaimed rubber dispersion was graphically illustrated with a table of data. The various uses for dispersions of all kinds were enumerated and displayed with samples of products.

Mr. Pinhasik's years of experience working with latices and dispersions reflected itself in his very informative talk.

The after-dinner program was highlighted by the talk of Mr. Raymond V. Darby, Chairman of the Los Angeles County Board of Supervisors, who emphasized to the rubber executives the importance of "Airports and Freeways, Now and in the Future, For Los Angeles County."

The December meeting of the Los Angeles Rubber Group was completely devoted to the entertainment of the members and their guests. This 1947 Christmas Party was acknowledged as one of the gayest in the history of the Group.

After a specially prepared prime rib dinner for each guest, the Group and its friends relaxed and enjoyed a star-studded revue. Music, comedy, and specialty acts of dancing and marionettes highlighted a very entertaining floor-show.

The entertainment revue was followed with the awaited announcement of new officers for 1948. The following members were elected to lead the Group during the coming year:

Chairman: Phil Drew (Goodyear); *Associate Chairman:* C. H. Churchill (Sterling); *Vice Chairman:* E. C. McLaughlin (H. M. Royal); *Treasurer:* Jack Ballagh (Patterson-Ballagh); *Secretary:* Tway W. Andrews (H. M. Royal); *Directors:* R. D. Abbott (C. P. Hall), Robert L. Short (Kirkhill), and George R. Steinbach (Atlas Sponge).

The induction of the new officers, and ensuing congratulations, was followed by the final part of the evening's program—the awarding of gifts to the holders of lucky numbers.

It is fully expected that the Los Angeles Rubber Group will continue its growth and increase its importance as a factor in the rubber industry of Southern California.

Competitive scientific research is saving the American motorist well over a billion dollars a year on his tire bill. So said John M. Miller, plant manager of the local United States Rubber Company tire plant, recently before a group of rubber technicians in a talk in which he computed the benefits of increased quality and lower costs through mass production efficiency.

"If tire quality and tire costs had remained at 1920 levels throughout the years, the public's tire bill, to date, would have been increased over 40 billion dollars," he said. "Through science engineering and management, the industry has thus contributed an amount equal to the national debt before the war to the nation's savings. It is by contributions like this that the present huge national debt will be paid."

He said the forces of competition had placed the tire industry in the unique position of actually lowering tire prices in a period of general inflationary tendencies. In 1927, the automobile owner got about 432 miles per tire dollar. Ten years ago he got around 800 miles per tire dollar. Today, the average motorist gets 1,600 miles for every dollar he spends for a tire, according to Miller.

United States Rubber Company has developed a new method of forming bevels and decorative grooves on concrete surfaces by means of rubber strips attached to the forms instead of conventional wood strips. The rubber is said to produce a smooth finish free of blemishes and it can be re-used many times, resulting in lower construction costs.

The new strips will be produced in various shapes and sizes for bevels and also decorative treatment. They are attached to the form with a waterproof adhesive. They can be removed easily without chipping the mortar. The new technique is being used for the first time on piers for a bridge spanning the Chesapeake & Delaware Ship Canal at Chesapeake City, Maryland.

A. L. "Al" Nemetz, associated with the W. J. Voit Rubber Co. for the past five years, the last two as general purchasing agent, has joined the Union Rubber Co. as general plant manager of that firm's camelback and tire repair material plant at 808 East 62nd Street. In his new post, Mr. Nemetz will handle much of the plant management formerly handled by Vern Ratliff, a partner in the concern.

The 1947 RUBBER RED BOOK is now available. Price: $5.00.

Booklets on Shell Dutrex

The Shell Oil Co., Inc., 50 West 50th St., New York 20, N. Y., has made several new booklets available on its Dutrex materials. These include "Shell Dutrex 7," "Shell Dutrex 20 and 25" and "Shell Dutrex for the Coating Materials Industries." The first booklet gives data on Dutrex 7, a heavy process oil for both natural and synthetic rubber, and covers the use of this oil in GR-S, neoprene and natural rubber stocks. Shell Dutrex 20 and 25 are plasticizers for vinyl chloride resins, and the booklet on these materials, in addition to giving physical and chemical properties of the materials themselves, discusses their use in mineral-filled polyvinyl chloride and in phonograph record stocks. The booklet devoted to the coated materials industries contains data on the use of various Dutrex materials in lacquers, varnishes, bodied tung oil, stains and preservatives, and in adhesives and binders. Copies of the booklets are available on request from Shell Oil.

Open Sample Display Room

A new sample display room has been opened by the New York Quartermaster Purchasing Office at 111 East 16th St., New York, N. Y. The new room is part of the Office's recently accelerated industrial mobilization program. The exhibit, the first of its kind, emphasizes closer cooperation between government and industry in providing for military requirements. It has been planned and arranged to supply the latest information available covering Quartermaster items for current procurement and will also assist in procurement planning with regard to commodities required by the Army and Navy for future use. Among items on display are footwear of all kinds, including those worn by allied and enemy soldiers.

Smith Talks on Black

Dr. W. R. Smith, chief research chemist of Godfrey L. Cabot, Inc., Boston, recently delivered two talks on carbon black to groups at the University of Buffalo. The first was given on December 4 to the Student Affiliated Chapter of the American Chemical Society, and the second on the following day at a University seminar. The talks, respectively, were on "Carbon Black" and "Recent Measurements on Heats of Adsorption on Carbon Blacks and their Relation to Reinforcement." In the latter, Dr. Smith discussed results of an extensive investigation being carried out by Cabot dealing with the heat of adsorption of various molecules on carbon black surfaces.

Describe Research Services

Foster D. Snell, Inc., consulting chemists and engineers of 29 West 15th St., New York 11, N. Y. has issued a special brochure under the title "Plastics and Rubber" describing the research and consulting services offered to industry on both of those materials. The brochure is one of a series issued by the company outlining forms of market research. Copies are available on request to the company.

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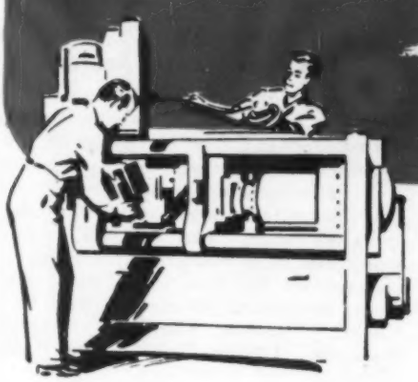

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CANADIAN NEWS

Negotiations have been completed for the purchase of approximately 30,000 horsepower by the Hydro-Electric Power Commission of Ontario from Polymer Corporation at Sarnia, it has been announced jointly by officials of the Commission and Polymer.

The contract has been made for a ten-year period and will go into effect as soon as the necessary new facilities have been installed by Polymer and the Commission. It is expected that Hydro will be ready to draw the power from the Sarnia synthetic rubber plant by October 1, 1948.

With its own steam and power plant, Polymer has supplied its own 60-cycle power for producing man-made rubber and chemicals. On a small scale it has also supplied small quantities of power to one of the large new industries which are growing up around the Polymer plant.

When Polymer power becomes available, it will help meet the steadily increasing demands in Western Ontario, particularly in the Sarnia area where the large new industries are being established.

The contract announced recently provides that Polymer will supply about 4,000 horsepower on a continuous basis throughout the year, and also will supply, during periods of peak load, an additional 26,000 horsepower as required by the Commission.

A $430,000-a-year order for Canadian manufactured synthetic rubber has been placed with Polymer Corporation, Sarnia, as a more or less direct result of tariff changes announced in November by Government officials at Ottawa. The announcement came from R. S. Wilson, vice-president in charge of sales for Goodyear Tire & Rubber Co., Akron, Ohio.

To the best of his knowledge, Mr. Wilson said this was the first order ever placed in Canada by an American firm for latex. It would mean a new flow of U. S. dollars into Canada.

He cited this deal, which he believed had been completed, as an example of how U. S. firms intend to co-operate with the Canadian government in carrying out their dollar program, planned to build up a favorable trading balance of U. S. funds.

Mr. Wilson was in Toronto recently, to address the Advertising and Sales Club on "College Training for Professional Salesmanship." "We believe we will be able to purchase about 180,000 lbs. a month of GR-S latex from the Canadian synthetic rubber plant at Sarnia," said Mr. Wilson, speaking for his company.

Long-range prospects for the sale of Canadian man-made rubber to European manufacturers are very good, J. R. Nicholson, executive vice-president of Polymer Corporation, Limited, said in an interview recently on his return from an extended trip through continental countries. Mr. Nicholson admitted that the immediate prospects were not too bright, due mainly to the critical "dollar shortage" in Britain and throughout Europe.

Accompanied by Dr. E. J. Buckler, manager of research and development, and Roger E. Hatsch, at that time European representative of the company. Mr. Nicholson arrived by air from Europe. Besides Britain, he visited rubber interests in France, Italy, Switzerland, Holland, Belgium, Denmark and Sweden. In almost every country, Mr. Nicholson found an increasing interest in butyl and other Polymer specialties.

Experimental work in Canada which led to the production of the first general purpose synthetic rubber was interestingly reviewed by Dr. J. S. Tapp, assistant manager of research of the Polymer Corporation, Sarnia, at the first regular meeting of the Ottawa section, Chemical Institute of Canada, recently held at Ottawa.

Dr. Tapp spoke of the prime properties required in man-made rubber, namely "elasticity to a great degree, vulcanizability, and availability." Many people in the middle of the nineteenth century recognized the requirement of vulcanizability, but it was left to Charles Goodyear to do something about it. It took a war to bring to attention the availability problem. As long as rubber was just rubber from a tree, only a limited number of things could be done with it. With the advent of synthetic rubber, new, undreamed of horizons opened for the rubber industry.

The increase in the retail and wholesale prices of automobile and truck tires in the United States is not expected to have any bearing whatsoever on costs of Canadian tires. In Canada the price of tires was dropped in September, and dealers say that this price will probably remain as is. Although the cost of rubber has risen, the Canadian manufacturers say, the decrease in price of finished tires was possible because rubber is now at pre-war production levels.

The Swift Canadian Co., Ltd., Toronto, has changed the name of its Glue Department to that of the Adhesive Products Department. The change was made in order to more clearly indicate the activities of the company's expanding glue and adhesive business. The new designation gives a better description of the scope of business, including research and manufacturing, in which the company is currently engaged. The company is now producing both latex and resin adhesives.

Industrial Adhesives, Ltd., is the name of a new company recently formed to engage in the manufacture of adhesives of all types, including synthetic resin emulsions and latices. A factory has been acquired in Toronto and the latest type of mixing, blending and converting machinery is being installed. J. A. C. Walters is president of the new company, and C. Kalthoff and E. A. Radford are vice-presidents.

R. E. Hatsch, until recently European representative of the Polymer Corporation, has been appointed manager of the Sales and Technical Services division, J. R. Nicholson, executive vice-president of the corporation has announced. He replaces J. W. Holmes, Jr., and will assume his new duties immediately. Mr. Holmes resigned from Polymer to accept a position with the Jefferson Chemical Company in New York City.

The appointment of Ira G. Needles as a member of the board of directors of the B. F. Goodrich Rubber Company of Canada, Ltd., has been announced by the company's president, George W. Sawin. The new board member is vice-president and general sales manager of the company.

Koffler Establishes Company

S. W. Koffler, formerly sales and sales promotion manager for the Loewenthal Company, Chicago, Ill., dealer in scrap rubber and manufacturer of link mats and matting, has announced the establishment of his own manufacturing and sales organization to be known as the Koffler Sales Corporation. The Loewenthal Co. recently dissolved and retired from the field. Mr. Koffler will continue in the manufacture of rubber link matting for industrial, institutional and accident prevention purposes, as well as individual mats for householders. The Koffler factory and salesroom are located at 3757 N. Racine Ave., Chicago, Illinois.

Enters Process Design Field

Entering the chemical process design field, the Rust Engineering Co., Pittsburgh, Penna., has announced the formation of a new process engineering division to extend the design and construction services it offers to the chemical, petroleum, and related industries. This expansion of facilities places the company in a position to undertake the entire execution of design, drafting, purchasing and construction of chemical process plants. In addition, it will offer a consulting service for planning, conducting and supervising research and development programs, and extending the results to commercial practice.

Tire Price Increase General

Following the action taken by the General Tire & Rubber Co. and the Norwalk Tire & Rubber Co. on November 10, price increases on passenger and truck tires were announced by practically all tire manufacturers at the end of November. Increases ranged from 5 to 8%, in most cases, with inner tube prices remaining unchanged for the most part. Among companies announcing the increases were U. S. Rubber, Firestone, Goodyear, Goodrich, Seiberling, Dayton Rubber and Pacific Rubber.

PLASTOFRIES 62

THE STABLE FLAMEPROOF PLASTICIZER

LARGER PRODUCTION NOW AVAILABLE AT NEW LOW PRICES

Manufactured for us exclusively by:

FRIES & FRIES, Inc.

Cincinnati, Ohio

PROPERTIES

PLASTOFRIES 62 is characterized by its non-inflammability, non-volatility, thermal and ultra-violet stability, and outstanding electrical properties. It is compatible with most commercial resins and elastomers and is particularly interesting for use with the vinyl copolymers, nitrocellulose, cellulose acetate, and cellulose mixed esters, such as the acetate-butyrate. In general, compounds of these resins with PLASTOFRIES 62, when properly formulated, will not burn.

Some of the representative physical properties of PLASTOFRIES 62 are given below:

Boiling Point	— 220°C at 10 mm
Melting Point	— 25°C
Specific Gravity	— 1.369 @ 25°/4°C
Color	— Light straw to water white
Weight per Gallon	— 11.5 lbs.

SUGGESTED USES

WITH VINYL RESINS:
PLASTOFRIES 62 is compatible with polyvinyl chloride and the vinyl copolymers, and is suggested for use with these resins in unsupported films, extruded shapes, and for fabric coatings. PLASTOFRIES 62 is of particular interest in plastisol and organisol compositions.

WITH CELLULOSE ESTERS:
The fabric coating industry is turning to PLASTOFRIES 62 as a plasticizer for cellulose esters where non-inflammability is essential. PLASTOFRIES 62 is also suggested for trial in molding powders, film, and transparent sheeting based on cellulose esters.

WITH OTHER RESINS:
Because of its wide compatibility with many resins used in plastics and protective coatings, PLASTOFRIES 62 is worthy of test in other uses, particularly where non-inflammability, thermal and ultra-violet stability, good electrical properties and non-volatility are important.

OTHER USES:
PLASTOFRIES 62 is also suggested for use as an oil additive and in electrical equipment as a dielectric liquid.

Write for a sample and Technical Bulletin

SCHEER CHEMICAL Co., Inc.

60 East 42 St., New York 17, N. Y.
MUrray Hill 2-1941

SCHEER CHEMICAL CO. Inc.

Silicone News

DC

Silastic* Seals Steam Iron

In devices as varied as aircraft engines and steam irons, Silastic is proving its usefulness as a gasketing material. The reasons are obvious enough—if you know Silastic. These silicone rubbers are the only rubbery materials that stay elastic on continuous exposure to temperatures ranging from −70° to 400° F., and that have maximum weather resistance and minimum compression set at high temperatures.

A Silastic gasket seals the steam chamber of the "Monitor" steam iron, made by Parts Manufacturing Company, division of F. L. Jacobs Co. This iron reaches its operating temperature of 500° F. in three minutes.

In the case of the "Monitor" steam iron shown above, the design engineer listed the properties required to give him a satisfactory gasket to seal the sole plate to the sole plate cover. His list read as follows: Wanted, a material which is

insoluble in water
stable up to 500° F.
stainless and odorless
permanently pliable and elastic

He tested many materials trying to find that combination of properties. None of them would work. Several months later he got a sample of Silastic 125. It met his needs so exactly that it seemed made to order. The initial cost per iron was very low and life proved to be long. None of these gaskets have failed in two years.

In addition to gasketing applications, Silastic is being used more and more extensively as an electrical insulating material and as calking and potting compounds. The properties of the various Silastic stocks are described in pamphlet No. V 21-2.

*TRADEMARK FOR DOW CORNING SILICONE RUBBER

DOW CORNING CORPORATION
MIDLAND, MICHIGAN
New York • Chicago • Cleveland • Los Angeles
In Canada: Fiberglas Canada, Ltd., Toronto
In England: Albright and Wilson, Ltd., London

Dow Corning
FIRST IN SILICONES

Dow Corning Silicone Products Include

FLUIDS
Damping
Hydraulic
Dielectric
Waterproofing
Lubricating
Diffusion Pump
Mold Release

GREASES
High Temperature
Low Temperature
Valve Lubricants
Stopcock
High Vacuum

COMPOUNDS
Ignition Sealing
Antifoam A

RESINS
Electrical Insulating
Laminating
Protective Coatings

SILASTIC*
Molding
Extruding
Coating
Laminating

*Trade Mark
Dow Corning
Corporation

NEW EQUIPMENT

Leafrigerator Tumbling Barrel

The Leafrigerator Tumbling Barrel operated under the Freezo-Wet Process has recently been developed by the Lea Manufacturing Co. of Waterbury, Conn., for the removal of flash or fins from soft rubber, molded goods. Parts being tumbled in a removable stainless steel wire basket are rendered hard and brittle by an inert liquid which is in direct contact with solid blocks of

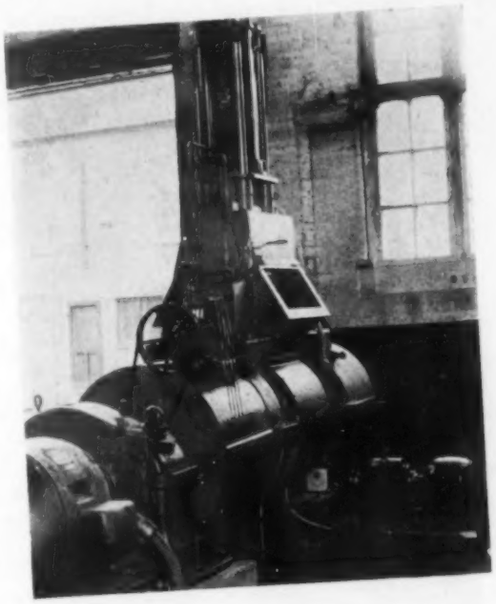
dry ice. The inert liquid serves as a very efficient heat transfer medium causing the flash to be sufficiently chilled within the first few moments of the tumbling cycle. The tumbling cycle is approximately 20 minutes; however, this varies with the flash condition of the parts being processed. Tests are said to have proven that the greatest labor and cost saving possibilities can be realized on soft rubber mechanical goods, such as household goods, laboratory supplies, toys, sponge rubber products, sporting goods, footwear and miscellaneous specialties.

Continuous operation of the Leafrigerator Tumbling Barrel can be realized by utilizing two tumbling baskets with each unit, thereby allowing the operator to load and unload one basket while the other is being processed. The tumbling barrel now utilizes dry ice; however, provision has been made for conversion from dry ice tumbling to mechanical refrigeration. Both the Leafrigerator Tumbling Barrel and the Freezo-Wet Process are fully patented.

Designed to clamp primarily onto flat or rectangular surfaces, a **flat stem, dial type thermometer** has been introduced by W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill. With the new flat stem design, the heating element goes down snugly against the object under test and presents a wide heat absorbing area. The thermometer can be supplied in flat stems of varying widths, thicknesses and lengths to meet individual requirements.

Northmaster Intensive Mixer

The Northmaster Intensive Mixer, designed for mixing all types of heavy and tenacious materials, has been developed by the Struthers Wells Corporation, Titusville, Pa. Available in working capacities of from 1 pint to 275 gallons, Northmaster Intensive Mixers have been



used successfully for processing natural and synthetic rubber, asphalt compositions, reclaimed rubber, linoleum, floor tile compositions, paints, a wide range of plastic products, as well as many other hard-to-handle materials. The Intensive Mixer is equipped with heating or cooling jackets for ram, trough and blades. Completely modern in design, the machine incorporates antifriction bearings with integral gear unit attached to the trough and rotating with it. New metal-to-metal seals guard against leakage. The mixing chamber is liquid- and dust-tight and rotates through 180° to permit easy dumping and cleaning.

FOR GOOD RUBBER PRODUCTS
USE PHILBLACK A

FOR FURTHER DETAILS, SEE AD ON PAGE 250

Test
RUBBER PRODUCTS
—for WEATHERING and FADING with
ATLAS-OMETERS

Twin-Arc
WEATHER - OMETER
Tests Results Twice As Fast

The new Atlas Twin-Arc Weather-Ometer has been developed to save time where speed in testing is essential.

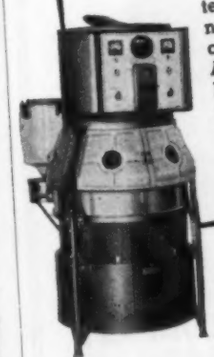
Where Federal Specifications call for a definite number of testing hours in the Atlas single arc Weather-Ometer, this time can be cut in half in the Atlas Twin-Arc.

Exclusive Atlas Twin-Arc Weather-Ometer features:

1. Temperature control.
2. Unlimited range and control of Light and Water Spray Periods.
3. Adjustable and automatic timing.
4. Insulated test chamber.
5. Operates continuously 24 hours without manual attention.
6. Carbon cost 28c per day.
7. Full automatic—Safe to operate unattended overnight.
8. Control panel contains Volt and Ammeters — Time Meter—Light and Water Cycle switch—Automatic time cut off switch — Voltage adjusting switch — Direct reading thermal regulator — Reactance Coil (cut power cost in half).

The Single Arc Model is a popular machine where high speed is not required.

FADE-OMETER



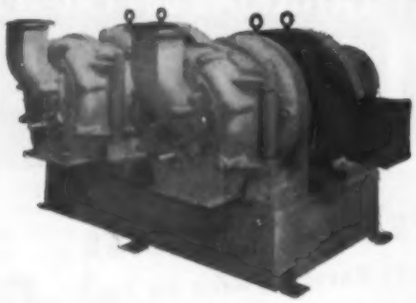
The recognized standard machine of the textile trade for determining the light-fastness of materials. Specimens are rotated around the Atlas Enclosed Violet Carbon Arc—the closest approach to natural sunlight. Temperature of the filtered air is automatically controlled. Proper humidity is furnished by evaporation from a constant-level water reservoir. Available with a wide variety of specimen holders and exposure masks.

• Originators and sole manufacturers of accelerated testing devices for a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer are used all over the world as accepted standard testing machines.

ATLAS ELECTRIC DEVICES CO.
361 West Superior Street, Chicago 10, Illinois

ROBINSON
PROCESSING EQUIPMENT

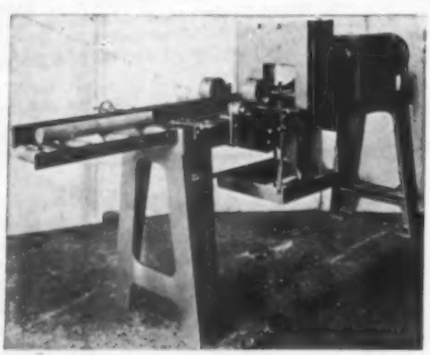
FRIGIDISC GRINDERS



This exceptionally sturdy, ruggedly constructed mill grinds material to finished size. Built-in cooling device. Cooling-liquid is continuously circulated against the back of each grinder disc. Robinson Processing Equipment of every type . . . Crushers, Grinders, Sifters, Attrition Mills . . . is designed to your requirements by experienced engineers. Literature available. Inquiries invited!

ROBINSON MANUFACTURING CO.
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N.Y.

SLICER MACHINE FOR EXTRUDED STOCKS



With High Speed Disc Cutting Blade, Automatic Feed and with Tandem Feed Wheels. Capacity Section Up to 3" by 4½"—Length ⅛" to 4".

UTILITY MANUFACTURING COMPANY
Cudahy, Wisconsin
Cable Address: UTILITY-MILWAUKEE
Long Distance Phone Call
MILWAUKEE—SHERIDAN 7020

New Baldwin-Tate-Emery Testing Machine

A new type of Baldwin-Tate-Emery testing machine, designed primarily for the precision testing of rubber, plastics, non-ferrous metals, textiles, fibers, and similar materials, was recently demonstrated at the plant of the A. H. Emery Co. in Stamford, Conn. The machine demonstrated was one of four built for the B. F. Goodrich Co., Monsanto Chemical Co., University of Minnesota, and the U. S. Bureau of Standards. Sales are being handled by the Baldwin Locomotive Works, Philadelphia 42, Penna.

Distinguishing features of the machine are its continuously-variable 400:1 positive speed range; great horizontal rigidity; complete elimination of backlash; and its high accuracy even in the lowest ranges. Its maximum capacity is 5,000 pounds. Unlike the larger capacity Baldwin-Tate-Emery machines, which employ hydraulic loading systems, the machine uses a mechanical screw system. The loading crosshead is driven by two screws which pass through nuts in the crosshead. These screws are rotated by a 1 to 1, or 10 to 1 gear transmission which is driven by a variable-speed motor with General Electric Thymotrol control. Speed of loading is steplessly variable from 0.05 inch to 20 inches per minute, and can be held constant within plus or minus 2%.

In the weighing system, the Emery capsule, which is used in most Baldwin testing machines, is replaced by a 100:1 mechanical compound lever using flex plates instead of the conventional knife edges at the load points and fulcrums. The specimen is pulled, compressed or flexed at the short lever end. The long end operates the force balance mechanism of the indicating system. Except for this difference in operation of the force balance mechanism, the indicator is, in general, the standard Tate-Emery type used on virtually all Baldwin machines. Four ranges are provided:—5,000 pounds in 5-pound units; 0-1,000 pounds in 1 pound units; 0-200 pounds in units of 0.2 pound; and 0-50 pounds in units of 0.05 pound. The standard Baldwin guarantee of indication accuracy applies: better than ½% of reading or 0.1% of range, whichever is greater.

Horizontal Belt Surfacing Machine

An improved horizontal belt surfacing machine, applicable to rubber, plastics, glass, fibre, etc., featuring a large working surface, 20 by 30 inches, which allows for the oscillation of large parts, has been introduced by the Production Machine Co., Greenfield, Mass. Operated

with either a wet or dry belt, the new unit, called Peerless Model 20, is equipped with a hinged hood type guard for controlling spray, a valve for controlling the amount of coolant plus sufficient nozzles, a centrifugal coolant pump mounted in a 32-gallon capacity tank, sealed bearings, movable center support bar for stability, processed pulleys that prevent slippage, and additional spray nozzles located beneath the pulley drive for cleaning the belt. Belt surface speed of the machine is 4600 feet per minute which is considered standard, but optional speeds are available. The unit requires 61¼ x 86⅜ inches of floor space, including tank, motor and guards. It weighs approximately 2600 pounds. The same unit is available in a 14-inch size.

The addition of a **new standardized truck** has been added to the line of load-carriers featured by the Market Forge Co., Everett, Mass. The truck is said to be desirable in plants which require trucks to be handled both indoors and outdoors, and where quietness of operation, cushioning of load, or unsatisfactory floors make the unit desirable.

FOR GOOD RUBBER PRODUCTS
USE PHILBLACK A

FOR FURTHER DETAILS, SEE AD ON PAGE 250

SIMPLEX
REG. TRADE MARK

RUBBER STRIP CUTTER
PATENTED

A PORTABLE machine capable of stripping slab rubber up to 1" thick at the rate of 20,000 feet in 8 hours. Any width desired.

SPECIAL FEATURES
- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion-induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

Now in use by many leading Rubber Manufacturers & Jobbers

Simplex Cloth Cutting Machine Co., Inc.
Manufacturers of a Complete Line of Cloth Cutting Machinery
270 West 39th St. New York 18, N. Y.
Cable Address—SIMPLEX, N. Y. *Phone*—WIsconsin 7-5547

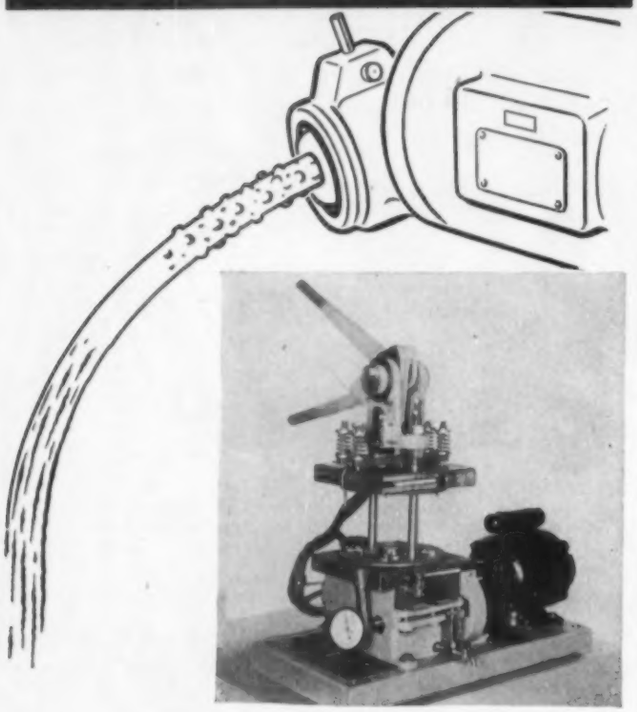
New Stock Cooling Rack

THIS New Rack offers a convenient method for storing materials that require cooling or air drying.

- Rack can be either stationary or mounted on casters.
- Trays have perforated metal surface and can be spaced to suit.
- Standard Rack has eighteen trays 36" x 36" spaced 2⅝" apart.

SPADONE MACHINE COMPANY
10 East 43rd St. New York 17, N. Y.

TESTED IS TRUSTED



WILL IT PROCESS?

The Mooney Viscometer is the newest *Scott Tester for determining the processability of rubber compounds. Rapid 3 to 5 minute cycle gives complete test in "Mooney Points," the recognized standard for modern compounding techniques.

"Adequate Testing Always Pays"

* Registered Trade Mark

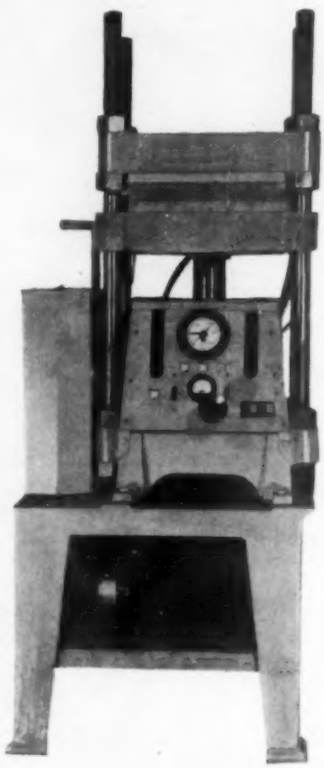
SCOTT TESTERS, INC.

85 Blackstone Street • Providence, R. I.

Standard of the World

Wabash 50-Ton Capacity Hydraulic Press

Laboratory Specialties, Inc., of Wabash, Indiana, recently introduced a self-contained molding or laminating unit of 50-ton capacity. The new unit, which is motor-driven through variable speed pulleys and features automatic maximum pressure control, is intended for plastic molding and laminating operations in plastic, rubber or



wood. It comes equipped with platens measuring 12 by 15 inches or 18 by 24 inches. Rapid closing of the platens is provided by a high-speed hydraulic pump which operates at high speed for closing and at low speed to afford the needed pressure for molding and laminating. The electrical heating elements in the platens are automatically controlled. A thermocouple temperature indicator on the front panel registers the temperature of either platen. A dial light on the panel shows when the current is functioning in the heating elements. Platens with water cooling channels may be secured if desired.

Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J., has introduced a **self-contained laboratory testing unit** with facilities for accurately controlling temperature and relative humidity within a working chamber having a clear space 18 by 18 by 18 inches. The temperature within the chamber can be varied over a range from 20° to 200° F.

A new specially-designed popular-priced **laboratory mill** for use in the grinding of analytical samples has been introduced by the Pulverizing Machinery Co., Summit, N. J. Known as the Mikro Samplmill, it is furnished in two models, one for bench use and a floor model.

REVIEWS

Standards on Electrical Insulating Materials. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 574 pp. $4.00.

The latest compilation of these standards by A.S.T.M. Committee D-9 on Electrical Insulating Materials gives some 90 specifications and tests covering a wide range of materials in this field There are groups of specifications or tests on the following: Insulating Varnishes, Paints and Lacquers, 7 tests; Plates, Sheets, Tubes, Rods, and Molded Materials, 9 specifications, 28 tests; Mineral Oils for Electrical Insulation, 9 tests; Ceramic Products (Glass, Porcelain, Steatite), 2 specifications, 4 tests; Solid Filling and Treating Compounds, 2 tests; Insulating Fabrics, 2 specifications, 3 tests; Insulating Papers, 3 tests; Mica Products, 1 specification, 3 tests; Electrical Tests, 6 tests; Rubber Products, 4 specifications; Textile Materials, 10 specifications; Miscellaneous, Servicing Units, Conditioning, pH Value Test, 2 specifications, 3 tests. In addition to these standards there is an appendix discussing the significance of tests of these materials, and information on the scope and personnel of A.S.T.M. Committee D-9. A detailed index completes the book.

•

Effect of Fuels Containing Aromatic Hydrocarbons on Neoprene Hose. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington 98, Delaware. 8½ x 11 in. 8 pp.

The service performance of aircraft fuel hose constructed of neoprene indicated that tests made by immersing a laboratory sample of a neoprene composition in aromatic hydrocarbons gave a distorted picture of their effect upon neoprene products. Accordingly, hose made of neoprene and low swell synthetic rubbers were compared on test equipment designed to simulate the service conditions encountered by aircraft fuel line hose, and the results of tests on such equipment are reported in this booklet. Other tests made, and reported, indicate that the reason for the distorted picture is that total immersion of a sample in an aromatic test fluid produces entirely different results than does exposure of one side of the sample to the test fluid, simulating a hose tube.

•

Approved Equipment for Industrial Fire Protection: 1947. Associated Factory Mutual Fire Insurance Companies, 184 High St., Boston 10, Mass. 8½ x 11 in. 136 pp.

The material used in the compilation of this book is based upon tests which were conducted by the Factory Mutual Laboratories for the Associated Factory Mutual Fire Insurance Companies. A listing of equipment which has been tested and approved by the Laboratory is provided. Company names and specifications are included for almost every type of fire-fighting device currently in use. An index is provided listing devices, and an index of manufacturers who produce fire-fighting equipment and machinery is also included.

•

Textolite Laminated Plastics. Plastics Division, General Electric Co., Pittsfield, Mass. 8½ x 11 in. 64 pp.

This booklet contains complete information on the manufacture, application, engineering and properties of all types of Textolite laminated applications. It lists 44 different grades of the sheet material along with their electrical, physical and mechanical properties. Other sections of the booklet contain information on Textolite tubes and rods, bearing materials, silent gears, decorative surfaces, translucent sheets, name-plates, molded-laminated plastics, low-pressure laminated plastics, methods and fabricating laminates.

Leatherlike Shoe Soles

OF BETTER QUALITY AT LOWER COST WITH

DAREX* Copolymer X 34

For longer wear in light-weight soles use X 34 to reinforce natural rubber.

You'll get . . .

- **high hardness**
- **stiffness**
- **abrasion**
- **flex life**

with low material cost and reduced processing time!

And Copolymer X 34 has more uses than a cat has lives:

1 In women's quality soles . . . for firmness, support

2 In platform soles . . . for bright color, comfort, flexibility

3 In work-shoe soles . . . to help resist oil, heat, and acids

4 In children's soles . . . for light-weight, sturdiness, flex life

5 In repair soles . . . for strength, ease of stitching, trim appearance

Order a bag today for a factory trial. Write for specific suggestions on your particular applications. Our technical service men will gladly help you in your development work.

TO SAVE GR-S, a blend of X 34 with reclaim gives you higher quality with lower cost.

DEWEY AND ALMY CHEMICAL CO.

ORGANIC CHEMICALS DIVISION

CAMBRIDGE 40, MASSACHUSETTS

safeguard against dust

here's a non-foaming

ANTI ADHESIVE

IN LIQUID FORM...

TEXOLUBE-R

Applied by spray, dipping or brushing TEXOLUBE-R forms a continuous unbroken coating. Even when spray applied, there is no danger of bubbles, surface breaks or unprotected areas. TEXOLUBE-R is easier to handle and easier to use. Forty percent solid content . . . shipped as a fluid concentrate, not a paste, it is always ready for use . . . always easily and accurately measured and mixed.

TEXOLUBE-R produces a "tack-proof," exceptionally tough, transparent film on all types of rubber, and has no harmful effect in any subsequent operations.

Send for free gallon sample or full drum on ten day trial basis.

THE TEXO CORP.
DANA & FLORAL
CINCINNATI 7, OHIO

TEXO

REVIEWS (CONT'D)

Synthetic Resins. Hercules Powder Co., Wilmington, Delaware. 8½ x 11 in. 24 pp.

A description of the properties and uses of all of the company's synthetic resins have been made available, for the first time, in this technical booklet. A key to specific uses for the synthetic resins is provided in the booklet by a chart which matches the resins with their actual as well as their potential uses. The chart also includes the page number on which the various resins are discussed. Brief descriptions of the following groups of resins are included in the booklet: methyl esters of rosin; the Cellolyns, first group of synthetic resins designed primarily for cellulosic lacquers; ester gums; Flexalyn resins, glycol esters of rosin; the Lewisols, a series of rosin maleates; the Pentalyn series of pentaerythritol resins; Petrex resins, poly pale esters; Staybelite esters.

•

Taber Abraser Accessories. (Bulletin No. 4702-3500) Taber Instrument Corp., North Tonawanda, New York. 8½ x 11 in. 12 pp.

This technical digest describes and illustrates new, improved accessories and other standard supplies designed to step-up efficiency of abrasion-resistance analyses with the Taber Abraser. Featured among the developments discussed are devices for continuously removing abradings from wear-track on the test specimen, controlling test operating time, refacing and standardizing Calibrase-type abrading wheels, and preparing thin, flexible materials for testing. The digest contains diagrams and photographs.

•

Rubber Chemicals and Their Uses. Akron Chemical Co., 255 Fountain St., Akron 4, Ohio. 4½ x 7½ in. 56 pp.

Intended as a handy reference guide for purchasing agents, compounders and research chemists, this book provides a listing of rubber chemicals and their uses, which are produced by the company, or by those organizations which the company represents. The book is arranged in "loose-leaf" style so that adjustments and changes can easily be made as they occur. An index has been added which lists all included materials. Alternate pages in the book are blank to permit the reader to make notes as he goes along.

•

Westinghouse Equipment for the Rubber Industry. (Educational Booklet No. B-3731). Westinghouse Electric Corp., East Pittsburgh, Penna. 8 x 11 in. 36 pp.

The company's activities in research, engineering and service as an electrical partner of the rubber industry are discussed in this educational booklet. Power and power distribution, and such specialized applications as radio frequency heating, water cooling, air handling, lighting and electronic air cleaning are considered. The booklet includes engineering drawings, charts and photographs. A table of contents is added.

•

U. S. Aluminum Building Wire Handbook. U. S. Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y. 8½ x 11 in. 36 pp.

Information relative to the company's line of aluminum building wires is to be found in this handbook. Portions of the book are devoted to discussions on electrical conductivity and resistance to corrosion, while test results in comparison with other wires are also given. Insulation properties, carrying capacities and physical properties are discussed.

•

Glossary for the Protective Coatings Industry. By L. J. Radi. R-B-H Dispersions, Division of Interchemical Corp., Bound Brook, New Jersey. 4 x 7 in. 60 pp.

This book provides a handy pocket-size reference to terms employed in the protective coatings industry. More than 600 words and terms, ranging from abietic acid to zanzibar, are set forth and defined. The author has included a bibliography of source materials used in the compilation of the book for the reader seeking additional information. Many terms indigenous to the rubber industry are included.

Aloyco Stainless Steel Valves and Fittings. (Catalog No. 47) Alloy Steel Products Co., Inc., Linden, New Jersey. 8½ x 11 in. 54 pp.

Complete descriptions of all standard Aloyco corrosion resistant valves and fittings, together with photographs and cross sections of them, as well as dimensional data and lists of alloys in which each style is stocked, are offered in this catalog. Special sections cover the design and construction features of the company's valves; compositions and descriptions of the range of alloys in which the valves are available; application data, listing specific alloy recommendations for handling nearly 400 different corrosive solutions; photographs of the company's valves in actual use in various processing industries; and plant photographs showing steps in the manufacture and assembly of Aloyco valves.

•

Lord Multiplane Mountings. (Bulletin No. 106). Lord Manufacturing Company, Erie, Penna. 8½ x 11 in. 12 pp.

Complete with diagrams and specifications, this bulletin offers an accounting of the company's shear-type bonded rubber mountings. Sections on their application in industry are included, as well as information as to size and specification, selection and installation, use and special characteristics. A chart is provided outlining the comparative deflection brought about by utilizing rubber-in-shear for vibration control.

•

Blaw-Knox Plants and Equipment for the Process Industries. (Bulletin No. 2204). Blaw-Knox Division, Blaw-Knox Co., Pittsburgh, Penna. 8½ x 11 in. 24 pp.

The comprehensive service offered by Blaw-Knox in the design, fabrication of equipment, construction and operation of processing units and complete plants is outlined in this bulletin. Typical handling of various types of plants, including those for the reclaiming of rubber and resin and varnish production, is discussed. Drawings and schematic diagrams are employed liberally throughout the bulletin.

•

Pyro, the Improved Surface Pyrometer. (Catalog No. 160). Pyrometer Instrument Co., 103 Lafayette St., New York 13, N. Y. 8½ x 11 in. 4 pp.

This catalog illustrates and describes the company's new surface pyrometer. Features of the new pyrometer are described and discussed, while the types and applications of Pyro Surface Thermocouples are also outlined. Two special purpose pyrometers, which were designed for specific purposes, receive attention in the catalog.

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REVIEWS (CONT'D)

Physical Properties of Synthetic Organic Chemicals. (Form 6136). Carbide and Carbon Chemicals Corp., 30 East 42nd St., New York 17, New York. 8½ x 11 in. 12 pp.

Designed as a condensed guide for users of organic chemicals, this booklet contains revised data on applications and physical properties for more than 175 synthetic organic chemicals. The material is presented in tabular form for ready and easy reference. As each organic chemical can be placed in a specific group or homologous series of related compounds, this natural grouping has been used in the arrangement of this booklet. A product index is also included, so that each chemical group can be easily located.

•

Clorafin, Hercules Chlorinated Paraffin. Hercules Powder Co., Wilmington, Delaware. 8½ x 11 in. 24 pp.

Information on many new applications for Clorafin, Hercules Powder Company's chlorinated paraffin, is given in this booklet, including revised information on the use of the product in flameproof and weather-proof textile coatings. The booklet also includes the results of tests of vinyl coatings and vinyl plastics containing Clorafin. The general properties of the various types of Clorafins are discussed, and an appendix to the booklet lists all trade names mentioned in the text and includes the chemical identity of these trade names, together with their owners.

•

Capacilog, "Electronic Scriber." (Educational Bulletin No. 7). Wheelco Instruments Co., 847 West Harrison St., Chicago 7, Ill. 8½ x 11 in. 16 pp.

Operational diagrams, schematic drawings, charts and listings explain the diversified functions of the company's new strip chart recorder. The operation of measuring systems as deflection, potentiometer and resistance thermometer, electronic circuit and recording system are treated individually. Control switching actions are shown on a simplified diagrammatical chart. A section of the bulletin gives instrument specifications and mounting dimensions.

•

Neoprene Type S. (Report No. 47-1). By C. E. McCormack. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington 98, Delaware. 6 x 9 in. 16 pp.

The physical and chemical properties of Neoprene Type S, an elastomer with properties which are particularly valuable for crepe soling, are given on this report. Compounding and processing recommendations are included, with typical formulas for various types of colored soles. The section on processing includes data on mixing, creping, plying, cementing and shoe building. A subject index is provided.

•

Handling, Sampling and Testing of Fatty Acids. Armour and Co., 1355 West 31st St., Chicago, Ill. 8½ x 11 in. 8 pp.

The following subjects are covered in this technical booklet: storing fatty acids; pumping fatty acids; process equipment; standard sampling methods and equipment; testing fatty acids; and tests commonly used and their meanings. A color conversion chart for fatty acids, which permits the comparison of color densities even though the color readings are expressed in different systems, is provided in the booklet.

•

Blueprint for Tramp Iron Removal. (Bulletin 102-B). Eriez Manufacturing Co., Erie, Penna. 8½ x 11 in. 4 pp.

Descriptions and explanations of the various types of magnetic equipment designed for industrial processing lines are contained in this two-color bulletin. Specific applications as well as the magnetic equipment necessary to do the job are fully discussed. Pertinent data and engineering drawings showing size, weight and construction of units are also included.

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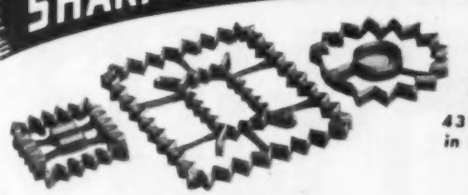

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, DEC. 16, 1947

Natural Rubber

The price of spot rubber on the Commodity Exchange has moved in the range of 388 points since our last report (November 17), dropping from a high of 23.50 cents on November 21 to 19.62 cents on December 9. The high of 23.50 cents reached on November 21 continued for several trading days, and then broke sharply to 22.50 cents on November 26. A firming up of the price has been evident in the past several days.

The declining trend was attributed in most quarters to the testimony offered by various rubber executives during the public hearings on the over-all rubber situation held in Washington during the week of December 1 by the House Armed Services Committee. It was evident at these hearings that the industry favors continuation of synthetic rubber controls for another year or so. Even should the law be modified, the consumption of substantial quantities of synthetic rubber are assured.

According to OMD, consumption of rubber in the United States during October amounted to 102,293 long tons, an increase of 13% over September. Of the October amount, 56,986 tons were natural rubber, 35,929 tons GR-S, 5,945 tons butyl, and the balance other synthetics. GR-S consumption during the month was considerably in excess of production. Imports of natural rubber during October amounted to 49,976 long tons.

Today's quotations in the outside market, London and Singapore, follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.22
December	.21⅞
January-March	.21
Thin Latex Crepe:	
Spot	.31½
January-March	.30½
Thin Brown Crepe, No. 2	.16¾
Ambers, No. 3	.16¾
Flat Bark Crepe	.13¾

London Market

(Standard Smoked Sheets)

January	21.83 - 22.24
April-June	20.30 - 20.46

Singapore Market

(Standard Smoked Sheets)

February	18.78 - 18.89

Synthetic Rubber

(Dry Types)

Butaprene NXM	.470 - .495
Chemigum 30 N4NS	.400 - .470
Chemigum 50 N4NS	.400 - .470
Chemigum N3	.450 - .520
Hycar OR-25	.400 - .425
Hycar OR-15	.470 - .495
Hycar OS-10	.400 - .425
Neoprene Type E	—— - .650
Neoprene Types CG and AC	—— - .500
Neoprene Types FR and KNR	—— - .750
Neoprene Type S	—— - .320
Neoprene Type NC	—— - .250
Perbunan 18	.390 - .415
Perbunan 26	.400 - .425
Perbunan 35	.470 - .495
Thiokol Type A	.370 - .470
Thiokol Type ST	.750 - .850
Thiokol Type FA	.520 - .620
Thiokol PR-1	.750 - .850

Scrap Rubber

The slight demand for scrap rubber noted last month, the first in quite some time, has continued during the past few weeks. It is still not too strong a demand, but some mixed passenger tires are moving at $13.00 a ton, and mixed beadless at $17.00 a ton. Some sales of buffings at $17.00 a ton have also been reported. Natural rubber peelings are also moving. Prices shown below are those which were in effect several months ago:

(Prices to Consumers, Delivered Akron)		
Mixed passenger tires	ton	$18.00
Beadless truck tires	ton	24.00
Mixed truck tires	ton	18.00
Beadless passenger tires	ton	24.00
No. 1 passenger peelings	ton	50.00
No. 1 truck peelings	ton	50.00
No. 2 passenger tubes	lb.	.07½
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06½
Mixed passenger tubes	lb.	.06¼
No. 2 truck tubes	lb.	.07¼
Red truck tubes	lb.	.07
Black truck tubes	lb.	.07
Buffings	ton	18.00

Reclaimed Rubber

There has been no slackening of the demand for reclaimed rubber in recent weeks, and several reclaimers find themselves hard pushed to meet all requirements. An interesting trend is developing in the demand for blends of natural and synthetic reclaim, and more and more rubber manufacturers are expressing a demand for such blends. Consumption of reclaim in October amounted to 26,898 long tons, as compared with 23,801 (revised) tons in September. Current quotations follow:

Tires				
Black, Acid	lb.	.08¾	@	.09¼
Black, Digester	lb.	.08	@	.08½
Peels	lb.	.09	@	.09½
GR-S Whole Tire	lb.	.08½	@	.09
Inner Tubes				
Black	lb.	.12¼	@	.13¼
Red	lb.	.13½	@	.14
GR-S	lb.	.09½	@	.10
Butyl	lb.	.08½	@	.09
Shoe				
Unwashed	lb.	.08¼	@	.08¾

Cotton Tire Fabrics

Based on rising prices of raw cotton and additional wage adjustments made at the mills, the price of cotton tire fabrics has gone up approximately 2 cents a pound since our last report. Prices on chafer fabrics, which were increased by 2 cents a pound last month, have been advanced an additional 2 cents in recent weeks. Demand for tire fabrics is still substantial and delivery difficulties to meet all requirements are foreseen. Current quotations follow:

Standard, Peeler, 12/4/2	lb.	.7600
Standard, Peeler, 14/4/2	lb.	.7800
Standard, Peeler, 16/4/3	lb.	.8050
Extra Staple, Peeler, 12/4/2	lb.	.8575
Extra Staple, Peeler, 14/4/2	lb.	.8775
Extra Staple, Peeler, 16/4/3	lb.	.9025

Chafers

14.4 oz. (per sq. yard)	lb.	.7550
9.25 oz. (per sq. yard)	lb.	.7125
11.65 oz. (per sq. yard)	lb.	.6850
8.9 oz. (per sq. yard)	lb.	.7275

Cotton

The price of middling uplands on the Cotton Exchange has swung in the range of 273 points since our last report (november 17), high for the period being 37.35 cents on December 10 and low 34.62 cents on November 18, the first day of the current report. The average price of middling uplands for the month of November was 34.50, based on 22 trading days.

Despite the rising trend in the past few weeks, with the price moving past the 37-cent level, there is considerable uncertainty in the cotton market regarding the future course of prices. Some economists contend that inventories are piling up at high prices and that the situation is very unhealthy. They point out that the primary markets are all bullish because they are long of commodities, but the public is beginning to resist the higher prices. As the prices go higher, the public is buying fewer units, and therefore the increase in inventories is an unhealthy sign.

The market is not too greatly concerned over efforts in Washington to force disclosure of those trading in commodities for speculation. It is pointed out that in the cotton futures market the amount of speculation probably does not exceed 20 percent of the total open interest. On the other hand, there are reports of mills that have covered their requirements a year ahead.

Quotations for middling uplands on the Exchange follow:

	Nov. 17	December 16		
	Close	High	Low	Close
March	33.98	36.18	35.76	36.11
July	32.98	34.68	34.30	34.57
October	——	31.74	31.39	31.68

Closing Rubber Prices on New York Commodity Exchange

FROM NOVEMBER 18 TO DECEMBER 16

Date		Spot	Mar.	May	July	Sept.	Sales
Nov.	18	23.00	21.19	20.72	20.15	19.90	145
	19	23.00	21.55	21.17	20.70	20.45	309
	20	23.50	21.65	21.20	20.60	20.35	51
	21	23.50	21.57	21.20	21.00	20.75	57
	22	——	——	——	——	——	——
	23	——	——	——	——	——	——
	24	23.50	21.88	21.30	20.95	20.67	194
	25	23.50	21.96	21.25	20.89	20.64	120
	26	22.50	21.25	20.40	19.90	19.65	168
	27	——	——	——	——	——	——
	28	22.75	21.22	20.70	20.34	20.00	96
	29	——	——	——	——	——	——
	30	——	——	——	——	——	——
Dec.	1	22.37	20.85	20.20	19.90	19.40	83
	2	21.75	20.35	19.90	19.62	19.10	161
	3	20.88	19.83	19.30	19.15	18.65	136
	4	20.75	19.70	19.45	19.30	18.80	490
	5	20.25	19.15	18.95	18.50	18.00	158
	6	——	——	——	——	——	——
	7	——	——	——	——	——	——
	8	19.88	19.00	18.70	18.55	18.00	152
	9	19.62	19.00	18.70	18.58	18.10	94
	10	19.88	19.25	19.05	18.90	18.40	66
	11	20.50	19.70	19.50	19.34	19.10	129
	12	21.62	20.75	20.35	20.10	19.80	217
	13	——	——	——	——	——	——
	14	——	——	——	——	——	——
	15	21.62	20.90	20.40	20.00	19.80	93
	16	21.37	20.75	20.29	19.85	19.60	132

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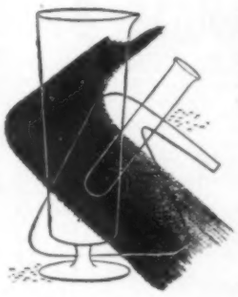

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CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

DECEMBER 10, 1947

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; l.c.l., less than carlot; dlvd., delivered; t.c., tank cars; min., minimum; dms., drums; cyl., cylinder.

* East of Mississippi.

—The arrangement of this section follows closely the Chemical Section of the 1947 RUBBER RED BOOK to which readers are referred to determine the classification of any material or brand name.

—Although suppliers of every material were contacted for price information, only those materials are listed for which quotations have been furnished us. The quotations are not guaranteed and prospective purchasers should contact suppliers for confirmation before placing orders. Suppliers are requested to send us regularly current prices on all of their materials used in the rubber industry.

—All requests for information or listings should be sent to Market Editor, RUBBER AGE, 250 West 57th St., New York 19, N. Y.

ACCELERATORS

A-1	lb.	.34	.39
A-10	lb.	.40	.47
A-19	lb.	.52	.58
A-32	lb.	.59	.69
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Accelerator No. 8 (dlvd.)	lb.	——	.75
Accelerator No. 49	lb.	.44	.45
Accelerator No. 89 (dlvd.)	lb.	——	1.20
Accelerator No. 122 (dlvd.)	lb.	——	1.30
Accelerator No. 552 (dlvd.)	lb.	——	1.63
Accelerator No. 808 (dlvd.)	lb.	.59	.61
Accelerator No. 833 (dlvd.)	lb.	1.13	1.15
Acrin (dlvd.)	lb.	——	.65
Advan	lb.	.52	.55
Altax	lb.	.35	.38
Arazate	lb.	——	1.53
Beutene	lb.	.59	.61
B-J-F	lb.	.34	.36
Butasan	lb.	——	1.10
Butazate	lb.	——	1.10
Butyl Eight	lb.	1.00	1.05
Captax	lb.	.27	.30
C-P-B	lb.	——	1.95
Cumate	lb.	——	1.60
Cuprax	lb.	.60	.62
Dibenzo G-M-F	lb.	——	1.50
Diorthotolylguanidine (dlvd.)	lb.	.48	.50
Diphenylguanidine (dlvd.)	lb.	.39	.40
El-Sixty	lb.	.39	.46
Ethasan	lb.	——	1.10
Ethazate	lb.	——	1.10
Ethyl Thiurad	lb.	——	1.25
Ethyl Tuex	lb.	——	1.25
Formaniline (dlvd.)	lb.	.36	.37
G-M-F	lb.	——	1.95
Good-rite Erie	lb.	.53	.55
Guantal	lb.	.43	.50
Hepteen	lb.	.42	.44
Base	lb.	1.80	1.85
Ledate	lb.	——	1.20
Mercaptobenzothiazole	lb.	.27	.29
Mercaptobenzothiazyl Disulfide	lb.	.35	.37
Methasan	lb.	——	1.20
Methazate	lb.	——	1.20
Monex	lb.	——	1.25
Mono Thiurad	lb.	——	1.25
Morfex 33	lb.	.60	.62
2-MT (dlvd.)	lb.	.58	.60
Novac	lb.	——	1.40
A-13	lb.	.65	.67
O-X-A-F	lb.	.38	.40
Pentex	lb.	.74	.77
Flour	lb.	.12¼	.12¾
Phenex (tons)	lb.	——	.40
Pipazate	lb.	——	1.53
Pip-Pip	lb.	——	1.63
R-2 Crystals	lb.	——	1.55
Rotax	lb.	.39	.42
SA 52	lb.	——	1.25
SA 57	lb.	——	1.20
SA 62	lb.	——	1.25
SA 66	lb.	——	1.60
SA 67	lb.	——	1.10
SA 77	lb.	——	1.10
Safex	lb.	——	1.15
Santocure	lb.	.53	.60
Selazate	lb.	——	1.60
Selenac (Ethyl, Methyl)	lb.	——	1.60
Setsit-5	lb.	.75	1.00
SPDX-G (tons)	lb.	——	.59
Tellurac	lb.	——	1.60
Tepidone (dlvd.)	lb.	——	.63
Tetrone (dlvd.)	lb.	——	1.25
A (dlvd.)	lb.	——	1.85
Thiocarbanilide (dlvd.)	lb.	——	.34
Thiofide	lb.	.35	.42
Thionex (dlvd.)	lb.	——	1.25
Thiotax	lb.	.27	.34
Thiurad	lb.	——	1.25
Thiuram E (and M) (dlvd.)	lb.	——	1.25
Trimene	lb.	.54	.56
Base	lb.	1.03	1.06
Triphenylguanidine (dlvd.)	lb.	——	.50
Tuads (Ethyl, Methyl)	lb.	——	1.25
Tuex	lb.	——	1.25
Ultex (tons)	lb.	——	1.23
Ureka	lb.	.55	.62
Blend B	lb.	.55	.62
C	lb.	.52	.59
Vulcanex (dlvd.)	lb.	——	.45
Z-B-X	lb.	——	2.45
Zenite (dlvd.)	lb.	.37	.39
A (dlvd.)	lb.	.42	.44
B (dlvd.)	lb.	.39	.41
Zimate (Butyl, Ethyl)	lb.	——	1.10
Zimate, Methyl	lb.	——	1.20

ACTIVATORS

Blue Lead, Sublimed (dlvd.)	lb.	.15¾	.15½
Fish Oil, Hydrogenated, Fatty Acid			
Hydrofol Acid (dlvd.)	lb.	.32¾	.36¼
Hyfac 52 (dlvd.)	lb.	.34	.35
Neo-Fat H.F.O. (dlvd.)	lb.	.33	.34
Stearex Beads (dlvd.)	lb.	.28	.29½
Lime, Hydrated			
Arrowhead	ton	16.00	19.50
Sierra	ton	16.00	19.50
Litharge			
Eagle (dlvd.)	lb.	.166	.176
FBS (dlvd.)	lb.	.166	.176
Magnesium Oxide, Heavy			
General Magnesite	lb.	.05½	.08
Michigan No. 15	lb.	.05	.05½
Permanente	lb.	.05	.06½
Magnesium Oxide, Light			
Baker's (Neoprene Grade)	lb.	——	.28
General Magnesite (Neoprene Grade)	lb.	——	.28
General Magnesite No. 101	lb.	——	.175
General Magnesite Standard	lb.	——	.22
K & M	lb.	——	.28
Michigan No. 30	lb.	——	.22½
No. 40	lb.	.25	.28
Witco Extra Light	lb.	.25	.27
Oleic Acid			
Elaine O-18 (dlvd.)	lb.	.31½	.33¾
L.C.P. Red Oil	lb.	.25½	.27¼
Red Oil (20-24 Saponified) (dlvd.)	lb.	.30½	.32¾
Palm Oil Fatty Acid (c.l.)	lb.	——	.11
Potassium Oleate (drums)	lb.	——	.29½
Red Lead			
Eagle (dlvd.)	lb.	.176	.186
No. 2 RM (dlvd.)	lb.	.181	.191
Sodium Laurate (drums)	lb.	——	.19
Sodium Oleate—Powder (drums)	lb.	——	.35
Paste (drums)	lb.	——	.20
Sodium Stearate—Powder (drums)	lb.	——	.35
USP Grade (drums)	lb.	——	.37
Stearic Acid, Single Pressed			
S-24 (dlvd.)	lb.	.37½	.38½
Stearex B (dlvd.)	lb.	.31½	.32½

ACTIVATORS (Cont'd)

Stearic Acid; Double Pressed			
Alba (dlvd.)	lb.	.40¾	.40¾
S-2-A (dlvd.)	lb.	.38	.39
S-2-B (dlvd.)	lb.	.37½	.38½
Stearic Acid, Other			
Neo-Fat 1-60 (dlvd.)	lb.	.37½	.39
Neo-Fat 1-65 (dlvd.)	lb.	.38½	.39½
Stearite	cwt.	36.00	38.00
White Lead Carbonate (dlvd.)	lb.	.16	.16½
Zinc Laurate (c.l.)	lb.	——	.29
Laurex	lb.	.32	.35
Zinc Stearate	lb.	.51	.52
Aquazinc	lb.	.20	.35

Unclassified Activators

Actifat (dms.)	lb.	——	.18
Acidex	lb.	.19	.32
Aero Ac 50	lb.	.50	.56
165	lb.	.37	.39
Barak (dlvd.)	lb.	——	.60
D-B-A	lb.	——	1.95
Delac J	lb.	.55	.57
P	lb.	.45	.48
Dibutylamine No. 117 (l.c.l., dms.)	lb.	——	.69
Palmalene (drums)	lb.	——	.15
Dutch Boy Normasal	lb.	——	.38¾
Polyac (dlvd.)	lb.	——	1.40
Ridacto (drums)	lb.	.22	.24
Snodotte (dlvd.)	lb.	.34½	.35½
SOAC (min. 10 dms.)	cwt.	——	12.00
Triamylamine No. 180 (l.c.l., drums)	lb.	——	1.01

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.02½	.02¾
National (cyl., dlvd.)	lb.	.16	.20
Aqua Ammonia (l.c.l., dms.)	lb.	——	.03
M.B.M. (l.c.l.)	lb.	——	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	——	.12
Regular	lb.	——	.08½

ANTI-OXIDANTS

Agerite Alba	lb.	2.20	2.30
Gel	lb.	.55	.57
Hipar	lb.	.76	.78
H. P.	lb.	.58	.60
Powder	lb.	.43	.45
Resin	lb.	.60	.62
Resin D	lb.	.43	.45
Stalite	lb.	.43	.45
White	lb.	1.35	1.45
Akroflex C (dlvd.)	lb.	.58	.60
Aminox	lb.	.43	.45
Antox (dlvd.)	lb.	.54	.56
Aranox	lb.	——	2.15
Benzoquinone	lb.	1.50	1.75
Betanox Special	lb.	.61	.63
B-L-E	lb.	.43	.45
Powder	lb.	.61	.63
B-X-A	lb.	.43	.45
Carvacrol	lb.	——	.85
Chlorcarvacrol	lb.	——	2.45
Flectol H	lb.	.43	.50
Flexamine	lb.	.58	.60
Gallic Acid, Tech.	lb.	1.10	1.23
USP or NF	lb.	1.27	1.40
Hydroquinone	lb.	.90	.90
Monomethylparaminophenol Sulfate	lb.	2.40	2.90
Neozone Standard (dlvd.)	lb.	.66	.68
A (dlvd.)	lb.	.43	.45
C (dlvd.)	lb.	.47	.49
D (dlvd.)	lb.	.43	.45
D Distilled (dlvd.)	lb.	.48	.50
Oxidex	lb.	——	3.40
Parazone (dlvd.)	lb.	——	.68
10	lb.	.37	.42
Perflectol	lb.	.58	.65
Permalux (dlvd.)	lb.	1.53	1.55
Pyrogallic Acid, Resublimed	lb.	2.60	2.65
USP Crystals	lb.	2.10	2.15
Resorcin, Tech. (dlvd.)	lb.	——	.64
Santoflex B	lb.	.43	.50
BX	lb.	.57	.64
Santovar-A	lb.	1.30	1.37
Santowhite	lb.	1.40	1.52
S.C.R. (tons)	lb.	——	.32
Solux (dlvd.)	lb.	1.48	1.50
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Nuodex 100 W.O. (dlvd.)	lb.	——	1.80
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Soligen Drier—Copper 8% (drums)	lb.	——	.21
Zinc 8% (dms.)	lb.	——	.19¾
Vancide	lb.	——	.80

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2286	lb.	——	.25
2553 (c.l., dms.)	lb.	——	.13
Bouquet 149	lb.	——	3.00
Coumarin	lb.	——	2.75
Curodex 19	lb.	——	4.75
188	lb.	——	5.75
198	lb.	——	6.75
D-6 Masking Perfume	lb.	——	1.35
Deodorant 65	lb.	——	1.00
Deodorant L-37	lb.	2.00	2.40
L-44	lb.	2.50	2.90
N.L.T.X.	lb.	1.85	2.15
Latex Perfume 5	lb.	——	3.25
6	lb.	——	7.50
9	lb.	——	.65
Neutrolgum Delta	lb.	——	2.40
Gamma	lb.	——	3.40
Parador A	lb.	2.00	2.50
B	lb.	.65	1.00
C	lb.	2.75	3.25
D	lb.	1.50	2.00
E	lb.	.25	.75
Perfume Oil Bouquet Vanilia M	lb.	2.40	2.75
Rodo No 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50
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Rubber Perfume 7	lb.	——	9.15
12	lb.	——	1.90
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Sponge Paste	lb.	——	.20
Unicel (dlvd.)	lb.	——	.60
ND (dlvd.)	lb.	——	1.00
Urea	ton	73.00	90.00

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Durez 12987	lb.	.48	.53
Interlake Resin No. 4162	lb.	——	1.50
MDI	lb.	7.25	7.75
50	lb.	3.60	3.85
Reanite	gal.	6.75	7.25
Rex Compound 482	gal.	——	1.05
Ty-Ply Q (and S)	gal.	6.75	9.00

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	——	9.80
Glacial—99½% (bbls.)	cwt.	——	15.50
Calcium Nitrate, Tech., Crystals	lb.	.12½	.15
Hydroxyacetic Acid—70% (dms.)	lb.	.059	.084
Zinc Nitrate, Tech.	lb.	——	.21½

COLORING AGENTS

Black

Carbon Black—See *Reinforcing Agents*			
Aquablak B (also M, R)	lb.	.08¾	.09¼
Aquablak S	lb.	.07¾	.08¾
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lbs. bags)	lb.	.09¼	.09½
Raven Black Pure Iron Oxide	cwt.	9.75	10.00

Blue

Blue GD, Dispersed (dlvd.)	lb.	——	3.95
Paste (dlvd.)	lb.	——	1.64
Blue X (dlvd.)	lb.	——	.94½
Blue YD, Dispersed (dlvd.)	lb.	——	2.50
Milori Blue 11840 (dlvd.)	lb.	——	.42
Monastral Fast Blue CP (dlvd.)	lb.	——	3.85
PCD, Dispersed (dlvd.)	lb.	——	2.50
Ramapo Blue	lb.	3.40	3.45
Rubber Blue X-1999	lb.	——	1.00
Stan-Tone Blue	lb.	1.40	4.00
Ultramarine	lb.	.14	.30
Victoria Blue BP-262-D	lb.	2.25	2.30

Brown

Brown Iron Oxide	lb.	——	.10
Mapico Brown (50 lb. bags)	lb.	——	.12

Green

Filo Green D-700 (and D-705)	lb.	——	.30
Green Chromium Oxide, Pure	cwt.	31.50	38.50
Green Chromium Oxide, Pure, Hydrated	cwt.	75.00	85.00
Green FD, Dispersed (dlvd.)	lb.	——	1.50
Monastral Fast Green GSD, Dispersed (dlvd.)	lb.	——	3.20
GSD Paste (dlvd.)	lb.	——	1.10
Permansa Green CP-594	lb.	——	1.35
Pigment Green B	lb.	——	1.50
GL-652D	lb.	.88	.93
Ramapo Green	lb.	4.00	4.05
Rubber Green X-1292	lb.	——	1.00
Stan-Tone Green	lb.	1.50	3.30
Utility Green	lb.	——	.30

Maroon

Stan-Tone Maroon	lb.	2.50	2.55

Orange

Molybdate Orange	lb.	——	.39
Orange F (dlvd.)	lb.	——	3.35
FD, Dispersed (dlvd.)	lb.	——	2.50
Rubber Orange X-2065	lb.	——	2.60
Stan-Tone Orange	lb.	1.65	2.25

Red

Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.10	1.35
Graphic Red (dlvd.)	lb.	——	.75
Indian Red, Pure	cwt.	10.00	10.25
Jozite	lb.	.08¼	.08¾
Mapico Red 297 (50 lb. bags)	lb.	.10	.10¼
Oximony Iron Oxide	lb.	——	.09
Red Iron Oxide, Light	cwt.	10.25	10.75
Red PB (dlvd.)	lb.	——	1.80
PBD, Dispersed (dlvd.)	lb.	——	1.65
2B (dlvd.)	lb.	——	1.65
2BD, Dispersed (dlvd.)	lb.	——	1.50
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Rubber Red RT-364	lb.	——	.75
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Stan-Tone Red	lb.	1.10	1.55
Watchung Red	lb.	——	1.80

White—Lithopone

Albalith	lb.	.05½	.05¾
Astrolith	lb.	.055	.0578
Cryptone No. 19	lb.	.07	.07¼
CB No. 21	lb.	.07	.07¼
Eagle	lb.	.06	.06¼
Permalith	lb.	.06	.06¼
Ponolith	lb.	.06	.06¾
Sunolith	lb.	.055	.0578

White—Titanium Pigments

Rayex	lb.	.17½	.20½
Ti-Cal	lb.	.06¾	.07¼
Ti-Pure	lb.	.17½	.18½
Titanox A—all grades (dlvd.)	lb.	.17½	.18
B-30 (dlvd.)	lb.	.07	.07½
C (dlvd.)	lb.	.06¾	.07¼
RA—all grades (dlvd.)	lb.	.19½	.20
RC-HT (dlvd.)	lb.	.06¾	.07¼
Zopaque	lb.	.16½	.17¼

White—Zinc Oxide (American Process)

AZO-ZZZ 11 (and 22, 33, 44, 55)	lb.	.10	.10¼
Eagle	lb.	.10	.10¼
Horse Head Special	lb.	.09½	.09¾
XX Red	lb.	.09½	.09¾
St. Joe Black Label	lb.	.10	.10¼
Green Label	lb.	.10	.10¼
Red Label	lb.	.10	.10¼

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	——	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.12¼	.12½
Eagle Green Seal	lb.	.11¾	.12
Eagle Red Seal	lb.	.11¼	.11½
Eagle White Seal	lb.	.12¼	.12½
Florence Green Seal	lb.	.11¾	.11½
Red Seal	lb.	.10¾	.11
White Seal	lb.	.11¾	.12
Kadox 72	lb.	.09½	.09¾
Black Label	lb.	.09½	.09¾
Red Label	lb.	.09½	.09¾
U. S. P. 12	lb.	.12¾	.13

White—Zinc Sulfide

Cryptone ZS-800	lb.	.10	.10¾

Yellow

Anchor Brand Pure Iron Oxide	cwt.	8.25	8.50
Cadmolith Yellow (bbls.)	lb.	——	.85
Chrome Yellow	lb.	——	.27
Chrome Yellow 12310	lb.	——	.27
Ferrox	cwt.	7.50	8.50
Mapico Yellow (50 lb. bags)	lb.	.07¾	.08
Rubber Yellow X-1940	lb.	——	1.60
Stan-Tone Yellow	lb.	1.20	1.75
Toluidine Yellow	lb.	——	1.60
YL-556-D	lb.	.75	.80
Oximony Iron Oxide	lb.	——	.06¾
Yellow G (dlvd.)	lb.	——	1.95
GD, Dispersed (dlvd.)	lb.	——	1.65
HN (dlvd.)	lb.	——	1.48
Zinc Yellow	lb.	——	.19

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Dilex	lb.	——	.32
Dispersaid	lb.	1.25	1.35
Halloid	lb.	.03¾	.09½
HornKem No. 1	gal.	——	1.60
No. 3G	gal.	——	1.75
No. 12	lb.	——	.17
Marasperse CB	lb.	.11½	.15
N	lb.	.09	.10
Ramol PW	lb.	.18	.19
Rubbex	lb.	——	.27½
Stan-Chem BQC	lb.	.12¼	.17¼
1067	lb.	——	.13½
1471	lb.	.1687	.2187
2251	lb.	.12¼	.17¼
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Yelkin TT	lb.	——	.22
Zinsper	lb.	——	.15

EXTENDERS

Advagum 1098	lb.	——	.65
Bunaweld Polymer No. 780	lb.	——	.22
No. 5514	lb.	——	.30
D-92 (and D-93) (dms.)	lb.	——	.12
Extender 600	lb.	——	.208
Multi-Plast MV 60 Emul.	gal.	.32	.37
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Synprowax	lb.	.16	.19
Vistanex	lb.	——	.32

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Chalk Whiting (l.c.l.)	lb.	.0150	.0175
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Alsite (c.l.)	ton	——	13.00
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Filfloc F 6000	lb.	——	.22
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Rayon, grey	lb.	——	.18
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Wool, bleached or dyed	lb.	.70	1.00
Glue, Bone (dlvd.)	lb.	.16½	.18½
Graphite	lb.	.05	.20
Ground Glass (l.c.l.)	lb.	.04	.06
Leather, Shredded	lb.	.05	.17
Lignin	lb.	.03	.06
Indulin	lb.	——	.09
Limestone, Pulverized	ton	3.25	10 00
Micro Velva	ton	30.00	32 00
Velvet Filler, Regular	ton	16.00	18 00
Magnesium Carbonate	lb.	.08	.09
Clearcarb	lb.	.10¾	.11¼
K & M	lb.	.08	.09
Magnesium Oxide	lb.	.05	.06
Magnesium Silicate	ton	18.00	35.00
Airex	ton	22.50	23 50
Asbestol	ton	17.00	25.00
Blue Star Talc	ton	——	21.00
L.S. Silver	ton	24.50	26.50
Sierra White	ton	20.75	22.75
Mica	lb.	.01¼	.07¾
Concord	lb.	.07	.07¾
Micro-Mica	lb.	.06¾	.07½
Mineralite (c.l.)	ton	30.00	40.00
Silversheen	lb.	.06½	.07
Triple A Mica (c.l.)	ton	——	25.00
Wet Ground Biotite Mica	lb.	.05½	.06¼
Wet Ground Mica No. 160	lb.	.06¾	.07½
Mineral Black Keystone 126	ton	——	13.00
Pyrophyllite			
Pyrax A (c.l.)	ton	——	12.50
WA (c.l.)	ton	——	14.00
Silica	ton	16.00	27.00
Blue Star	ton	——	21.50
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Talc, Domestic	ton	9.00	20.00
Walnut Shell Flour	ton	35.00	65.00
Whiting, Commercial	ton	8.00	20.00
Cameline (c.l.)	ton	8.50	10.00
C-C-O White	ton	——	14.50
Keystone (c.l.)	ton	——	16.00
Rambo No. 1 White	ton	——	9.00
Snowflake (c.l.)	ton	——	18.00
Veroc (c.l.)	ton	——	8.50
York White (c.l.)	ton	——	9.00
Wood Flour	ton	20.00	62.18

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	1.05	1.35
Black Out	gal.	4.50	8.00
Shellac, Orange Gum	lb.	.60	.70
VanWax	gal.	1.25	1.55

FLAME RETARDANTS

Chlorinated Paraffin	lb.	.10	.25
Halowax	lb.	.24	.30
Zinc Borate 3167	lb.	.12	.16¾
Zyrox	lb.	.71	.79

LUBRICANTS, MOLD

Aquadag	lb.	3.15	3.45
Aquarex L Paste (dlvd.)	lb.	——	.85
MDL Paste (dlvd.)	lb.	——	.32
Borax, Granular (l.c.l.)	ton	70.00	80.00
Colite Concentrate (dms.)	gal.	——	.90
Concentrex	lb.	——	.20
Dipex	lb.	.14	.18

LUBRICANTS, MOLD (Cont'd)

Dri-Lube	lb.	——	.18
Erlen Mold Lubricant	gal.	1.25	1.50
Glycerized Lubricant	gal.	——	1.50
Glydag	lb.	1.30	2.00
G.T.M.C. Solution	lb.	1.05	1.35
Kokobace	lb.	——	.12
Latex-Lube (dlvd.)	lb.	——	.22¾
Liqui-Lube (dlvd.)	lb.	——	.16¾
Lubrex	lb.	.25	.30
Migralube	lb.	——	.30
Moldex	lb.	——	.12½
Moldeze No. 1	gal.	——	36.00
No. 2	gal.	——	10.00
No. 3	gal.	——	25.00
Mold-Slick	lb.	.202	.215
Orvus WA Paste (dms.)	lb.	——	.25
Prodag	lb.	.25	.38
Redotex Flakes (dlvd.)	lb.	.29⅜	.30
Powder (dlvd.)	lb.	.29⅜	.30½
Rubber-Flo	gal.	——	1.15
Rubber-Glo	gal.	——	.94
Rusco Mold Paste	lb.	.12	.18
Sericite (l.c.l.)	ton	65.00	75.00
Ulco Mold Soap	lb.	.16	.29
Werkrite Flakes (dlvd.)	lb.	.28⅜	.29
Powder (dlvd.)	lb.	.29⅜	.30

LUBRICANTS, RUBBER

Lithium Stearate	lb.	.75	.77
Propylene Stearate (drums)	lb.	——	.40
Rubberol	lb.	——	.18½

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	——	.43
Calcium Stearate	lb.	——	.48
Orel	gal.	1.85	2.00
Polyethylene Glycol	lb.	.25	.26
Rexanol A	lb.	——	.11
Separex A	lb.	——	.15
Zinc Stearate	lb.	.54	.55

MOLD CLEANERS

Actusol (dlvd.)	gal.	——	1.45
Metso 99	cwt.	3.05	4.45
Granular	cwt.	2.50	3.55
Rubber-Sol	gal.	——	1.89
Shelblast	ton	80.00	140.00
Sodium Silicate	cwt.	.80	1.40
Sprex A.C. (dlvd.)	lb.	——	.15½

PEPTIZING AGENTS

Peptizer P-12	lb.	.84	.90

PLASTICIZERS & SOFTENERS

AA (drums)	lb.	——	.15¾
Acto 500	lb.	——	.09
Adipol BCA (dms.)	lb.	.44½	.45
Amalgamator 2-4	lb.	——	.30
American Pine Tar	gal.	.32	.43
Bardex	lb.	.05	.05¼
Bardol	lb.	.02¼	.03
B	lb.	.05	.05¼
Bayol D	gal.	.29½	.31½
F	gal.	.46	.49
Beeswax, Refined & Bleached	lb.	.64	.74
Yellow Refined	lb.	.63½	.68
Bondogen	lb.	.55	.85
B.R.C. No. 20	lb.	.0105	.0115
B.R.H. 2	lb.	.0225	.0235
BRS 700	lb.	.012	.018
B.R.T. 3	lb.	.019	.02
4	lb.	.02	.021
7	lb.	.0215	.0225
B.R.V.	lb.	.03	.0375
Bunarex Resins	lb.	——	.06½
Bunatak M	lb.	——	.20
O	lb.	——	.18
R	lb.	——	.14
U	lb.	——	.15
No. 21	lb.	——	.08
No. 90	lb.	——	.08
No. 865	lb.	——	.17
No. 1080	lb.	——	.09½
Burgundy Pitch	lb.	.1026	.1090
Butac	lb.	.11	.12
Butyl Benzyl Sebacate	lb.	.75	.77½
Butyl Palmitate	lb.	——	.26⅜
Butyl Roleate	lb.	.176	.18
BWH-1	lb.	——	.11
Camphol (t.c.)	ton	——	42.00
Candelilla Wax, Prime	lb.	.78	.85
Carbonex	lb.	.03	.03½
S Flakes	lb.	.04½	.05
S Plastic	lb.	.0435	.046
Carbowax 4000 (drums)	lb.	.29	.30
Cardolite 615	lb.	.37	.40
816	lb.	.25½	.28½
5858	lb.	.42	.46
Carnauba Wax, Crude	lb.	1.30	1.35
Refined	lb.	1.40	1.45
Substitute	lb.	.45	1.08
Yellow	lb.	1.75	1.80

PLASTICIZERS & SOFTENERS (Cont'd)

Celluflex 142 (and 179 (drums)	lb.	——	.37½
Ceresine Wax	lb.	.15	.20
Contogum	lb.	.06¾	.10¼
Cumar Resins	lb.	.05½	.14½
D.B.M.	lb.	——	.30
Degras, Common	lb.	.10	.14
Diamylphenol (l.c.l., dms.)	lb.	——	.21
Dibenzyl Ether (drums)	lb.	——	.40
Dibenzyl Sebacate	lb.	.66	.70½
Dibutyl Phthalate	lb.	.36	.385
Dibutyl Sebacate—Tech.	lb.	.75¼	.77¾
C.P.	lb.	.77¾	.80¼
Dicapryl Phthalate	lb.	——	.45
Di-Carbitol Phthalate (dms.)	lb.	.39½	.40
Dicyclohexyl Phthalate	lb.	——	.43
Dielex	lb.	.05½	.06
Diethyl Phthalate (t.c.)	lb.	.31½	.38½
Dihexyl Sebacate	lb.	.73¾	.76¼
Dimethyl Phthalate	lb.	——	.26
Dimethyl Sebacate	lb.	.77¾	.80¼
Dinopol (dms.)	lb.	.46½	.47
Dioctyl Phthalate (dms.)	lb.	.42½	.43
Dipolymer Oil	gal.	.33	.38
Dispersing Oil No. 10	lb.	.04½	.04¾
Dutrex A (B, 5, 6)	lb.	.02½	.03¾
15	gal.	.10	.189
20, 21, 25	lb.	——	.03
Econo-Plast (drums)	lb.	.03¼	.03¾
ELA (dlvd.)	lb.	——	.80
Estac	lb.	——	.16
Ethox (dms.)	lb.	.38½	.39
Flexol DOP	lb.	——	.379
TOF	lb.	.45	.52
3GH	lb.	.55	.60
3GO	lb.	.515	.60
4GO	lb.	.40	.47
H-70	lb.	.56¾	.64½
Hercolyn (dlvd.)	lb.	.15½	.16
Herron-H.T.	gal.	.17	.23
Herron-Plas	lb.	——	.03½
Herron-Wax	lb.	——	.05¼
HT-300	lb.	.45¾	.53
Indonex 633½ (634½, 638½, 639½)	gal.	.11½	.16
VG (dlvd.)	lb.	——	.07
Indopol H-300 (bbls.)	gal.	1.28	1.32
JMH	lb.	——	.65
Kapsol (dms.)	lb.	.44½	.45
KP 23 (dms.)	lb.	.41½	.42
70 (dms.)	lb.	.40½	.41
120 (dms.)	lb.	.48½	.49
140 (dms.)	lb.	.49½	.50
150 (dms.)	lb.	.38½	.39
Kronisol (drums)	lb.	.38½	.39
Kronitex (drums)	lb.	.31½	.32
Lanolin, Tech. Anhydrous	lb.	.20	.26
Lead Oleate	lb.	.16½	.42
Lindol (drums)	lb.	——	.33½
2-Mercaptoethanol (drums)	lb.	——	.75
Methox (dms.)	lb.	.35½	.36
Methyl Oleate	lb.	——	.20
Methyl Stearate	lb.	——	.34
Monoplex DBS	lb.	.90	.91
Monoplex DOS	lb.	.84	.85
5 (dms.)	lb.	.98	1.00
11 (dms.)	lb.	.50	.51
16 (dms.)	lb.	.45	.46
Montan Substitute No. 506	lb.	.425	.435
Montan Wax, Crude	lb.	.50	.55
Monten Wax (c.l.)	lb.	.52	.55
Monty Wax	lb.	——	.35
Multi-Plast (drums)	lb.	.04½	.05
Naftolen HV (and R-100) (drums)	lb.	.11	.12
LV and MV (drums)	lb.	.05¼	.05¾
Natac	lb.	.1050	.1150
Neolene 210 (t.c.)	lb.	——	.16
212 (t.c.)	lb.	——	.14
220 (t.c.)	lb.	——	.15
Nerium	lb.	——	.09
Nevillac Resins (dms.)	lb.	.23	.45
Neville Resins (dms.)	lb.	.09	.14½
Nevindene Resins (dms.)	lb.	.11½	.14½
Nevinol (dms.)	lb.	——	.16
Nevoll	lb.	.03	.04
Nevtex 10 (dms.)	lb.	——	.08½
Nuba 1 (and 2) (dms.)	lb.	——	.03½
3X (dms.)	lb.	——	.05
15 (and 30) Oil (dms.)	lb.	——	.17¼
781 Oil (dms.)	lb.	——	.22
No. 480 Oil Proof Resin	lb.	——	.15
Opalwax	lb.	——	.45
Ortho-Nitrobiphenyl	lb.	.06	.11
Ozokerite Wax No. 64 White	lb.	.31	.32
Yellow	lb.	.25	.26
P-1 (and 4, 6, 8, 20)	lb.	.26½	.33
P-75	lb.	.66	.72
Pale 4 (and 1000)	lb.	——	.17¼
Palm Oil	lb.	——	.11
Paradene Resins (dms.)	lb.	.05½	.06½
Para Flux (dms.)	gal.	——	.18
2016 (l.c.l.)	gal.	.20	.21
Para Lube (l.c.l.)	lb.	.046	.048
Paraplex G-25	lb.	.90	.91
G-40	lb.	.48¾	.49¾
Parmo	lb.	.06	.13½
Pentalene 90 (l.c.l., dms.)	lb.	——	.17
92 (l.c.l., drums)	lb.	——	.25

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THE 30 TON ELECTRIC HOT PLATE MOLDING PRESS

$525.00

- Specially designed for the rubber and plastics industries where speed and ease of operation are essential to low cost production.
- May be used for production runs or laboratory control work.
- Available with any number of openings. Steam heated platens available at a slight extra cost. Larger platens and motor-driven hydraulic power units also available.
- This M & N Press features
  - Visual temperature indicator
  - Electrically heated thermostatically controlled platens
  - Dual Pressure hand pump
  - Compactness
  - Large platen area
  - All steel construction

SPECIFICATIONS

SIZE OF BASE	16" x 12"	DAYLIGHT OPENING	10"
OVERALL HEIGHT	42"	STROKE	6"
PLATEN SIZE	12" x 12"	RAM DIAMETER	5"
CAPACITY	30 tons	APPROX. WEIGHT	400 lbs.

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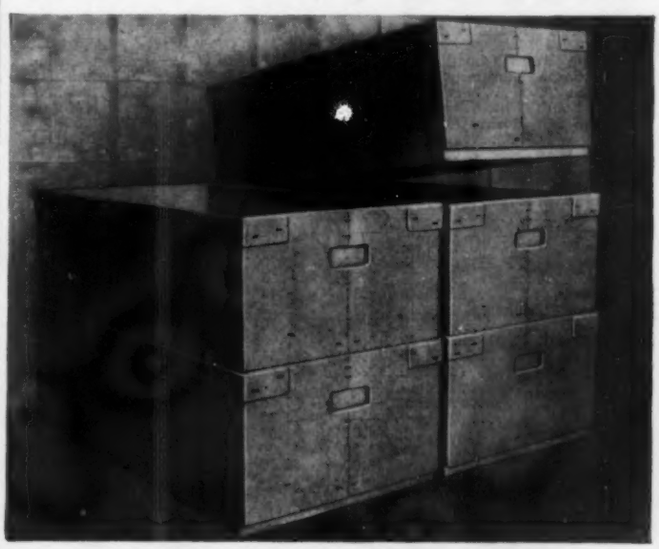

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Box R-78, illustrated, has a capacity of 2 cubic feet, but weighs only 8½ pounds, thus increasing your "payload."

Handy finger-tip depressions provide a good gripping surface, but keep out destructive sunlight, air, and dust.

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Write today for details on 4 stock sizes of stackers.

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PLASTICIZERS & SOFTENERS (Cont'd)

Pentaphen No. 114 (l.c.l., bags)	lb.	——	.23
Pepton 22	lb.	.70	.75
PG-16 (drums)	lb.	——	.34
Philplast No. 1	gal.	.18	.35
No. 2	gal.	.13	.35
Picco 10 (and 25)	lb.	——	.11
75 (and 100)	lb.	——	.10½
S.O.S.	gal.	.29	.34
Piccocizer 30	lb.	.05½	.06
Piccolastic A (and B, C, D, E)	lb.	.20	.20½
F	lb.	.12½	.13
Piccolyte S Resins	lb.	.17	.20½
Piccoumaron Resins	lb.	.05	.13½
Piccovar	lb.	.09¼	.11½
Piccovol	lb.	.02	.02¾
Pictar	gal.	.18	.23
Plas-Blend 360	lb.	.03¼	.04½
Plastac M	lb.	——	.09¼
Plasticizer No. 1889	lb.	——	.77
No. 2069 (l.c.l.)	gal.	——	.23
No. 2070 (l.c.l.)	gal.	——	.30
Plasticizer SC	lb.	.50	.52
Plasticizer VA-1	lb.	——	.40
Plastoflex 50	lb.	.36	.37
J-21	lb.	——	.41
Plastogen	lb.	.07¾	.12
Plastolein X-55 (dms.)	lb.	——	.60
X-148 (dms.)	lb.	——	.70
Plastone	lb.	.27	.30
Polymel D	lb.	——	.20
Polymel Liquid	gal.	.12	.17
Polymel Resins	lb.	.029	.05
PT 400 (600, 800) (c.l., dms.)	gal.	.30	.39
Refrigerator Oil 145-R	gal.	——	1.25
Reogen	lb.	.11½	.16
465 Resin (drums)	lb.	——	.04½
Resin 731	lb.	——	.13¾
Resin C	lb.	.015	.021
Resinex	lb.	.02¾	.03¼
L-4	lb.	.01¾	.02½
Ridbo 369 (drums)	lb.	.08	.09
369-F (drums)	lb.	——	.12
Rosin Oil	gal.	.54	1.20
R.P.A. No. 2 (dlvd.)	lb.	——	.65
No. 3 (dlvd.)	lb.	——	.46
No. 4 (dlvd.)	lb.	——	.80
No. 5 (dlvd.)	lb.	——	.57
R.S.O. Softening Oil	lb.	.03	.05
Rubtar	gal.	——	.40
Santicizer B-16	lb.	.50	.57
E-15	lb.	.47	.54
M-17	lb.	.44	.51
No. 140	lb.	.31	.38
Softener No. 20	gal.	.09	.25
S.P.C.	lb.	——	.19½
Stanolind Petrolatum	lb.	.037	.081
Wax	lb.	.25	.30
Staybelite Resin (dms.)	lb.	——	.11
Sunny South Burgundy Pitch	cwt.	10.51	10.75
Sunny South Pine Tar	gal.	.30	.41
Sunny South Rosin Oil	gal.	.50	.67¼
Superla Wax	lb.	.25	.30
Syncera Wax	lb.	.175	.225
Synplasticizer	lb.	——	.10
Syn Tac (c.l.)	gal.	——	.33
Synthol	lb.	——	.22½
Tar, Refined	gal.	.12	.17
K-Tarnel NR (t.c.)	lb.	——	.0851
Terpene A	gal.	——	.65
TP-90B (and TP-95)	lb.	.65	.75
TP98	lb.	.55	.65
Triacetin	lb.	.34	.45
Tricresyl Phosphate	lb.	.31	.38
Turgum S	lb.	.09½	.10½
Vanadaset B, C, D	lb.	.021	.055
Pulverized	lb.	.08½	.31
Solution	gal.	.40	.65
Vistac No. 1	gal.	——	1.32
No. 2	gal.	——	1.66
No. 4	gal.	——	1.80
Wilcor-Plast	lb.	.02⅛	.02⅜
Witresin—Granular	ton	41.00	43.00
Solid	ton	36.00	38.00

PROCESSING AIDS

Castor Oil, Processed (dms.)	lb.	——	.17¼
Refined (drums)	lb.	——	.15¾
Castorwax (min. 400 lbs.)	lb.	——	.25
Dutrex 7	lb.	.02½	.03¼
30	gal.	.24	.27
ELA (dlvd.)	lb.	——	.80
Resin No. 510	lb.	——	.19
Zeton (dms.)	lb.	——	.32

PROTECTIVE & STABILIZING AGENTS

Agchem SA-9 (to SA-12)	lb.	.65	1.02
Alpha Protein	lb.	.28	.32
Arcostocrat	lb.	——	.07½
Acacia	lb.	.12¾	.21
Carob Bean Flour	lb.	.42	.50
Casein	lb.	.33	.40
Ethylene Diamine 68%	lb.	.57	.58
Karaya Gum	lb.	.36	.45
Prosein	lb.	.071	.09
Rex Compound No. 2801	lb.	——	.15
Sodium Alginate	lb.	——	1.50

PROTECTING AGENTS (Cont'd)

Stablex B	lb.	——	.95
Tragacanth Flakes	lb.	.60	1.35

RECLAIMING AGENTS

1-D Heavy Oil (drums)	lb.	.04	.05
No. 517 H.B. Oil	gal.	.11½	.16½
535	gal.	.22	.27
No. 523 H.S. Oil	gal.	.22	.27
C-6 Oil (and 28, 32)	gal.	.33	.38
C-10 Oil	gal.	.21	.25
C-33 Oil	gal.	.19	.24
Caustic Soda—Flake 76% (c.l., drums)	cwt.	——	3.25
Liquid 50% (t.c.)	cwt.	——	2.25
Solid 76% (c.l., dms.)	cwt.	2.50	2.85
Cresylic Acid (99-100%)	gal.	1.20	1.29
D-4	gal.	.19	.24
E-5	gal.	.17	.22
Heavy Aromatic Naphtha (t.c.)	gal.	——	8.25
LX-83 Reclaiming Solvent	gal.	.13	.24
LX-572 Reclaiming Oil	gal.	.17	.28
PT 75 (and 101)	gal.	.30	.39
PT 150 Solventene	gal.	.60	.75
Q Oil	gal.	.206	.256
Reclaiming Oil 1621	lb.	.02	.02¾
Reclaiming Reagent No. 3	lb.	.12	.15
Reclaiming Resin No. 1	gal.	.15	.35
R.P.A. No. 3 (dlvd.)	lb.	——	.46
Soda Ash (c.l., bags)	cwt.	——	1.20
Solvent 534	gal.	.22	.27
Solvent Oil 21	gal.	——	.24
Wilcor Reclaiming Oil No 111 (drums)	gal.	.28	.32
No. 151 (drums)	gal.	.28	.32
X-1 Resinous Oil	lb.	.0135	.02
X-60 Solvent	gal.	.22	.30

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0632	.102
Continental F	lb.	.0632	.1025
Croflex	lb.	.0632	.1025
Crow	lb.	.0632	.1025
Dixiedensed (and S)	lb.	.0632	.1025
Huber HX	lb.	.0632	.1050
Kosmobile (and S)	lb.	.0632	.1025
Kosmos T	lb.	.0632	.1025
Micronex HPC	lb.	.0632	.1025
Spheron 4	lb.	.0632	.102
Witco Disperso No. 6	lb.	.0632	.1025

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0632	.102
Continental A	lb.	.0632	.1050
Croflex TH	lb.	.0632	.1025
Dixie R-1	lb.	.0632	.1025
Dixiedensed HM (and S-66)	lb.	.0632	.1025
Huber TX	lb.	.0632	.1050
Kosmobile HM (and S-66, SMG)	lb.	.0632	.1025
Kosmos M	lb.	.0632	.1025
Micronex Standard	lb.	.0632	.1025
Spheron 6	lb.	.0632	.102
Witco Disperso No. 1	lb.	.0632	.1025

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0632	.102
Collocarb	lb.	——	.065
Continental AA	lb.	.0632	.1025
Croflex 77	lb.	.0632	.1025
Dixiedensed 77	lb.	.0632	.1025
Kosmobile 77	lb.	.0632	.1025
Micronex W-6	lb.	.0632	.1025
Spheron 9	lb.	.0632	.102
Witco Disperso No. 12	lb.	.0632	.1025
Wyex	lb.	.0632	.105

Channel, Conductive (CC) (bags)

Dixie 5	lb.	.0740	.1175
Kosmink	lb.	.0740	.1175
Spheron C	lb.	.08	.12½
I	lb.	.066	.111
N	lb.	.18½	.25
Voltex	lb.	.15	.18½

Furnace, High Elongation (HEF) (bags)

Sterling K	lb.	.05	.09

Furnace, High Modulus (HMF) (bags)

Continex HMF	lb.	.05	.09
Dixie 40	lb.	.05	.09
Kosmos 40	lb.	.05	.09
Modulex	lb.	.05	.09
Philblack A	lb.	.05	.06
Statex 93	lb.	.05	.09
Sterling L	lb.	.05	.09

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF	lb.	.03½	.07½
Dixie 20	lb.	.03½	.07½

Furnace, Semi-Reinforcing (Cont'd)

Essex	lb.	.03½	.07½
Furnex	lb.	.03½	.07½
Gastex	lb.	.03½	.06½
Kosmos 20	lb.	.03½	.07½
Pelletex	lb.	.03½	.06½
Seminex	lb.	.03½	.05½
Sterling R	lb.	.03½	.07½
Sterling S	lb.	.03½	.07¼

Furnace, Fine (FF) (bags)

Statex B	lb.	.05¼	.09¼

Furnace, High Abrasion (HAF) (bags)

Philblack O	lb.	.07	.08

Thermal, Fine (FT) (bags)

P-33 (c.l.)	lb.	——	.05

Thermal, Medium (MT) (bags)

Thermax (c.l.)	lb.	——	.03

REINFORCING AGENTS—MISCELLANEOUS

Darex Copolymer No. 3	lb.	.39½	.42
No. X34	lb.	.39½	.42
Darex Copolymer Latex No. 3 (and X34)	lb.	.36½	.50
Durez 12687 (and 12707)	lb.	——	.32
Durez 13355	lb.	——	.26
Marbon B	lb.	.65	.75
S and S-1	lb.	.41	.48
Marmix	gal.	1.16	1.35
Naftex EPC	lb.	.084	.1025
HMF	lb.	.068	.09
MPC	lb.	.084	.1025
SRF	lb.	.058	.075
Pliolite S6 Resin	lb.	.41	.42
G Masterbatch	lb.	.40	.41
G50 Masterbatch	lb.	.40	.41
R Masterbatch	lb.	.43	.44
Wilcorite R Resins	lb.	.29	.35

RETARDERS

ESEN	lb.	.34	.36
Retardac 15A	lb.	.15	.16½
Retardex	lb.	——	.51

RUBBER SUBSTITUTES

Mineral Rubber

38	ton	26.00	32.50
Black Diamond	ton	26.00	27.50
Byerlyte	ton	42.50	57.50
Gilsonite, Selects (c.l.)	ton	33.50	34.50
Hard Hydrocarbon (dms.)	ton	40.00	42.00
Herron Flake	ton	38.50	40.00
Mineral Rubber, Granulated	ton	30.00	35.00
Solid	ton	27.00	32.00
Parmr (drums)	ton	26.00	30.00
Pioneer	ton	33.00	60.00

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.27	.38
Brown	lb.	.18	.38
Dispersed	lb.	.28	.49
Neophax	lb.	.20	.38
White	lb.	.13	.39

Miscellaneous Rubber Substitutes

Gilsowax	lb.	.04½	.05
Insulac	lb.	.06	.06½
Resin No. 1098 (drums)	lb.	——	.65
No. 1198	lb.	.31	.35
Wilmex M-4 (and M-6)	lb.	.05½	.06

SOLVENTS

Acetone (dlvd.)	lb.	.07½	.10
American Dipentene	gal.	.45	.46
Amsco Lactol Spirits (t.c.)	gal.	——	.14
Rubber Solvent (t.c.)	gal.	——	.13½
Solv A (t.c.)	gal.	——	.18½
Solv B (t.c.)	gal.	——	.22½
Special Napthalite (t.c.)	gal.	——	.13½
Textile Spirits (t.c.)	gal.	——	.14
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	——	.08
Benzol 90%	gal.	.17	.24
Butyl Acetate (t.c.)	lb.	——	.305
Butyl Alcohol (t.c.)	lb.	——	.305
Secondary (dlvd.)	lb.	.10½	.11½
Tertiary (dlvd.)	lb.	.12	.14
Carbon Bisulfide, Tech.	lb.	.05	.08
Carbon Tetrachloride	gal.	——	.80
Cosol 1	gal.	.26	.34
Cosol 2	gal.	.25	.33
Cyclohexane	lb.	.08	.10
Cyclohexanone	lb.	.25	.27
Diacetone, Pure (dlvd.)	lb.	.12	.14
Dichlorethyl Ether (dms.)	lb.	.16	.17
Formal (dms.)	lb.	.26	.27

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SOLVENTS (Cont'd)

Dichloropentane (l.c.l.)	lb.	—	.04½
-Dipentene 122 (dms.)	gal.	—	.51
Ethyl Alcohol (t.c.)	gal.	—	.96
Ethylene Dichloride (drums, dlvd.)	lb.	.08	.09
Halowax Oil	lb.	.27	.30
Heptanes (t.c.)	gal.	—	.15
Hexalin Cyclohexanol	lb.	.20	.22
Hexanes (t.c.)	gal.	—	.15¾
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.45	.57½
Ether, Ref. (dlvd.)	lb.	.04½	.06½
Mesityl Oxide (dlvd.)	lb.	.11½	.13½
Methanol (dms., dlvd.)	gal.	.37	.44
Methyl Acetone, Syn. (drums, dlvd.)	gal.	.46	.52
Methyl n-Amyl Ketone (drums)	lb.	.29	.30
Methyl Ethyl Ketone	lb.	.10	.12
Methyl Isobutyl Ketone (dlvd.)	lb.	.12½	.14½
N-5 Pentane Mix. (t.c.)	gal.	—	.06½
N-6 Hexanes (t.c.)	gal.	—	.11¾
N-7 Heptanes (t.c.)	gal.	—	.10½
Petrolene (t.c.)	gal.	—	.10⅝
Picolines, Alpha, Refined	lb.	.30	.34
Mixed	lb.	—	.30
Pyridine, Refined	lb.	.65	.69
Quinoline	lb.	.43	.52
Rubber Solvent (t.c.)	gal.	—	.12½
Rubsol (t.c.)	gal.	—	.08625
Skellysolve B (Hexanes) (t.c.)	gal.	—	.124
C (Heptanes) (t.c.)	gal.	—	.116
E (Octanes) (t.c.)	gal.	—	.135
R (Solvent Naphtha)	gal.	—	.095
Solvenol	gal.	—	.51
Solvent, Crude, Light	gal.	.19	.28
Solvesso 100 (t.c.)	gal.	—	.2812
150 (t.c.)	gal.	—	.2912
Sunny South Dipentene	gal.	.45	.46
Toluene (drums)	gal.	—	.28
Toluol (t.c.)	gal.	—	.23
Trichlorethane	lb.	.11	.12
Triglycol Dichloride (dms.)	lb.	—	.49
Tromex	lb.	.078	.083
X-7 Sp. Heptanes (t.c.)	gal.	—	.10
X-8-A Solvent Naphtha	gal.	—	.07¾
Xylene (drums)	gal.	—	.28

STABILIZING AGENTS (for Vinyl Resins)

Dutch Boy DS-207	lb.	—	.48
Plumb-O-Sil A	lb.	—	.26
Tribase	lb.	—	.22¾
Eagle Basic Silicate White Lead	lb.	.18½	.19¾
Lead Stearate, Precip.	lb.	.55	.57
Fused	lb.	.60	.62
Stabelan A	lb.	.55	.65
Stabilizer No. 1	lb.	1.55	2.05
Stabilizer No. 320	lb.	.75	1.15
Stabilizer V-7939	lb.	—	.69
Stabilizer JCX	lb.	—	.45
SN	lb.	.36	.42
V-1-N	lb.	.44	.50
V-9	lb.	—	.85
Vanstay-16	lb.	.33	.35

SUN CHECKING AGENTS

Antisol	lb.	.23	.24
Heliozone (dlvd.)	lb.	.23	.24
Sunproof	lb.	.23	.24
Jr.	lb.	.17	.18
Tonox	lb.	.50	.52

TACKIFIERS

Advaresin 100	lb.	.13½	.14
Agchem RC 30	gal.	.65	1.34
Amberol ST-137X	lb.	.33	.33½
Beckopol 1400 (dlvd.)	lb.	.25	.25½
Dutrex 44	gal.	—	.919
E-310 Resin Emulsion	lb.	—	.14
Galex	lb.	.13¾	.25
Koresin	lb.	.46	.58
Lindol Emulsion (drums)	lb.	—	.38
Liquid Rubber Flux	lb.	—	.125
Pentacizer 344	lb.	—	.20
Pentalyn Resins (dlvd.)	lb.	.15	.21½
Resin V	lb.	—	.23¼
Rubtack	lb.	—	.12
Staybelite Esters (dlvd.)	lb.	.19½	.22½
Super-Beckacite No. 1001 (dlvd.)	lb.	.42	.42½
Wilcorite R-30	lb.	—	.40

THICKENERS (FOR LATEX)

Acrysol GS	lb.	.14½	.22
Betanol (drums)	lb.	—	.70
Emulsorex No. 5	lb.	—	.35
Propylene Laurate (dms.)	lb.	—	.36
Sodium Silicate	lb.	.01	.02

VULCANIZING AGENTS

Selenium

Vandex	lb.	—	2.00

Sulfur

Crystex (l.c.l.)	lb.	.27	.30
Dispersed Sulfur	lb.	—	.09
No. 2	lb.	.10	.15
Devil (c.l.)	cwt.	—	1.35
Insoluble Sulfur 60	lb.	—	.16
Star (c.l.)	cwt.	—	1.85
Tire	cwt.	1.50	2.00
Tube (c.l., dlvd.)	cwt.	2.00	2.60

Tellurium

Latex Telloy	lb.	—	2.00
Telloy	lb.	—	2.00

Miscellaneous Vulcanizing Agents

VA-3	lb.	.55	.65
Vultac No. 1	lb.	.38	.45
No. 2	lb.	.38	.45
No. 3	lb.	.42	.49

WASHING & FINISHING AGENTS

Apcolene (t.c.)	gal.	—	.09⅜

WETTING AGENTS

Advawet No. 15	lb.	—	.18
No. 33	lb.	.40	.43
Aerosol OT 70% Clear	lb.	.80	1.00
Agchem SA-15 (16, 18)	lb.	.17	.29
Alrosol (dms.)	gal.	—	.48
Aquarex BBX Conc. (dlvd.)	lb.	—	.78
D (dlvd.)	lb.	—	.75
ME (dlvd.)	lb.	—	.90
NNS (dlvd.)	lb.	—	.90
NS (dlvd.)	lb.	—	.75
Areskap 50	lb.	.30	.38
Dry 100	lb.	.60	.72
Aresket 240	lb.	.30	.38
Dry 300	lb.	.60	.72
Aresklene 375	lb.	.42	.57
Dry 400	lb.	.70	.84
Lecithin	lb.	—	.22
Santomerse D	lb.	.43	.65
S	lb.	.13	.25
Sorbit P	lb.	—	.28
Stablex G	lb.	—	.70
Triton K-60	lb.	.33½	.41
N-100	lb.	.59½	.67
R-100	lb.	.14½	.25
720	lb.	.30½	.38
770	lb.	.21¾	.29¼
Vultamol	lb.	—	.17½

MISCELLANEOUS CHEMICALS

Acto 450 (550-W, 600, 630)	lb.	.109	.145
Agchem SA-17	lb.	—	.29
Aquarex SMO (dlvd.)	lb.	—	.50
A.S.T.M. Oil No. 1 (and No. 3)	gal.	1.00	1.25
Black Shield 4701	lb.	—	.21
Copper Inhibitor X-872-L	lb.	—	1.50
2-Ethylhexanol (dms., dlvd.)	lb.	.25	.26
Glycerine, 88% Sap., Crude (dlvd.)	lb.	.35½	.36
Hydrozo	lb.	—	.51
MODX (tons)	lb.	—	.29½
Para Resin No. 1784	lb.	—	.09¾
No. 2457 (c.l.)	lb.	—	.04
No. 2718 (c.l.)	lb.	—	.04
pHR	lb.	—	2.00
Pigmented Filmite	lb.	—	.16½
Resin No. 1226	lb.	.31½	.36½
Resorcinol (dlvd.)	lb.	—	.64
Rio Resin	lb.	.48	.50
Santocel	lb.	—	.50
Serictic, PA No. 400	lb.	.02	.03
Sublac	lb.	.31	.34
Synpep N (drums)	lb.	—	.54
Thiokol LP-2	lb.	.85	.95
LP-3	lb.	.85	.95
Tysonite	lb.	.21½	.22¼
Vanfre	gal.	2.00	2.50
Vinsol Resin—Lumps	lb.	—	.06

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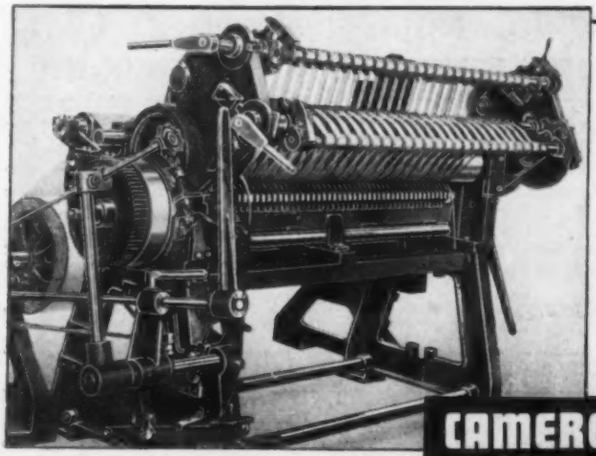

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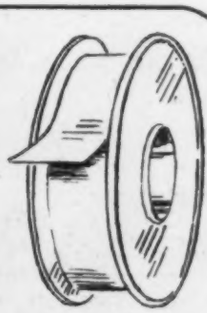

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LATEX CHEMIST, thoroughly trained in the compounding and processing of normal and synthetic rubber latices for the saturation of papers in the imitation leather field. A combination of analytical and research experience would be helpful. Excellent oppoftunity, good salary, right person. In writing, state full particulars regarding background, age, salary expected. Address Box 2556, RUBBER AGE.

ENGINEER, age twenty-five to forty, with some mechanical goods production and engineering experience. This is an unusual opportunity in mechanical rubber products of a highly specialized nature. Extensive experience not absolutely necessary. Address Box 2586, RUBBER AGE.

WANTED: By small progressive Mid-West molded rubber goods plant operating over thirty years, a man to understudy Chief Engineer. Must be versed in compound building, mold design; knowledge of costing helpful. Excellent opportunity for right man, age twenty-six to thirty-eight. State full qualifications, references, wages, etc. Address Box 2602, RUBBER AGE.

FACTORY MANAGER, experienced in compounding and manufacture of mechanical goods, natural and synthetic rubber. Excellent opportunity. Address Box, 2608, RUBBER AGE.

DEVELOPMENT CHEMIST, with several years experience in rubber manufacturing for development work on synthetic rubber, cements & plastics for spreading, calendering and press curing. Excellent opportunity, metropolitan New York area. Give resume and minimum salary requirements in first letter. Address Box 2612, RUBBER AGE.

MEN FOR TECHNICAL SALES WORK. Location Atlantic Seaboard and Midwest. Applicant must be familiar with products used in the rubber and plastics field and should have previous sales experience. In reply, please give full information, age, salary, etc. Address Box 2618, RUBBER AGE.

FACTORY MANAGER: To take complete charge small plant. Must have knowledge of installation and maintenance of equipment and handling of labor, also some chemical experience, preferably in hard rubber. All replies confidential. Address Box 2620, RUBBER AGE.

WANTED: Man to take charge in the manufacture of rubberized cork sheets. Must know necessary equipment and set-up of same. Also familiar with compounding of this material. Position open in vicinity of Boston. Address Box 2599, RUBBER AGE.

SUPERVISING CHEMIST wanted for executive position to handle latex compounding and adhesive plant located in northern New Jersey. Background should include production, development, and sales promotion. Excellent opportunity for progressive individual. Address Box 2603, RUBBER AGE.

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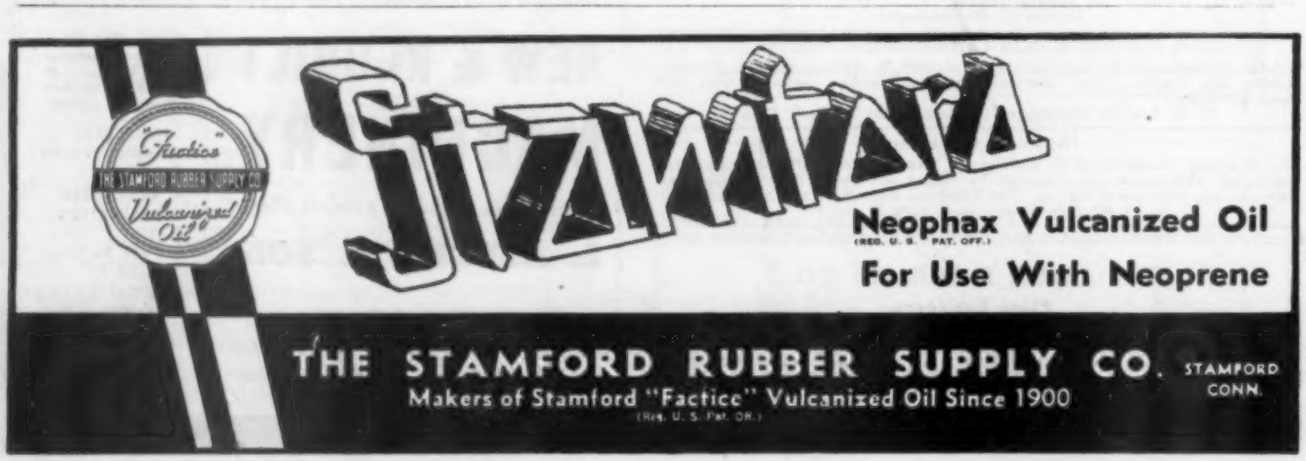

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